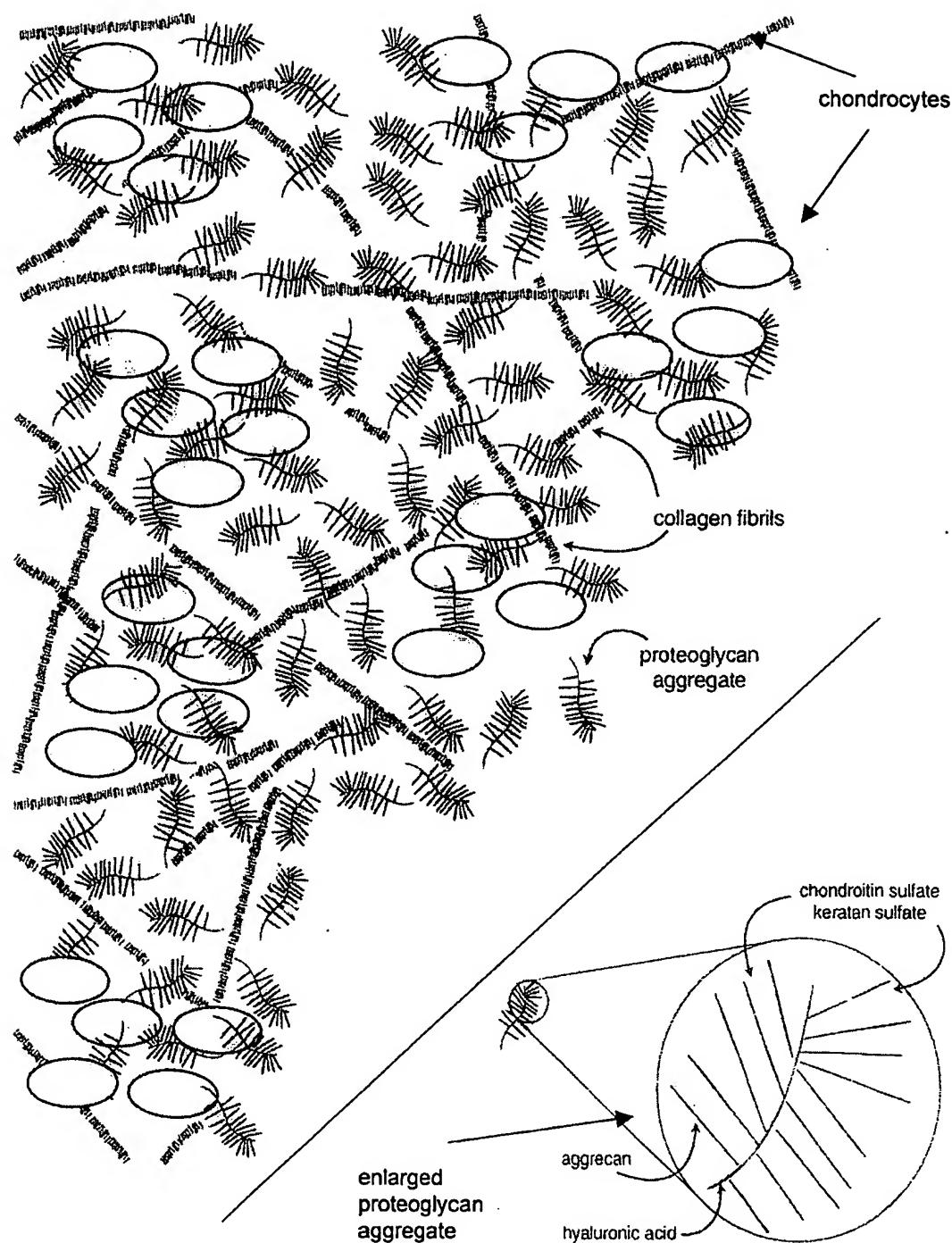




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FIG. 1



**FIG. 1A**

**FIG. 2**

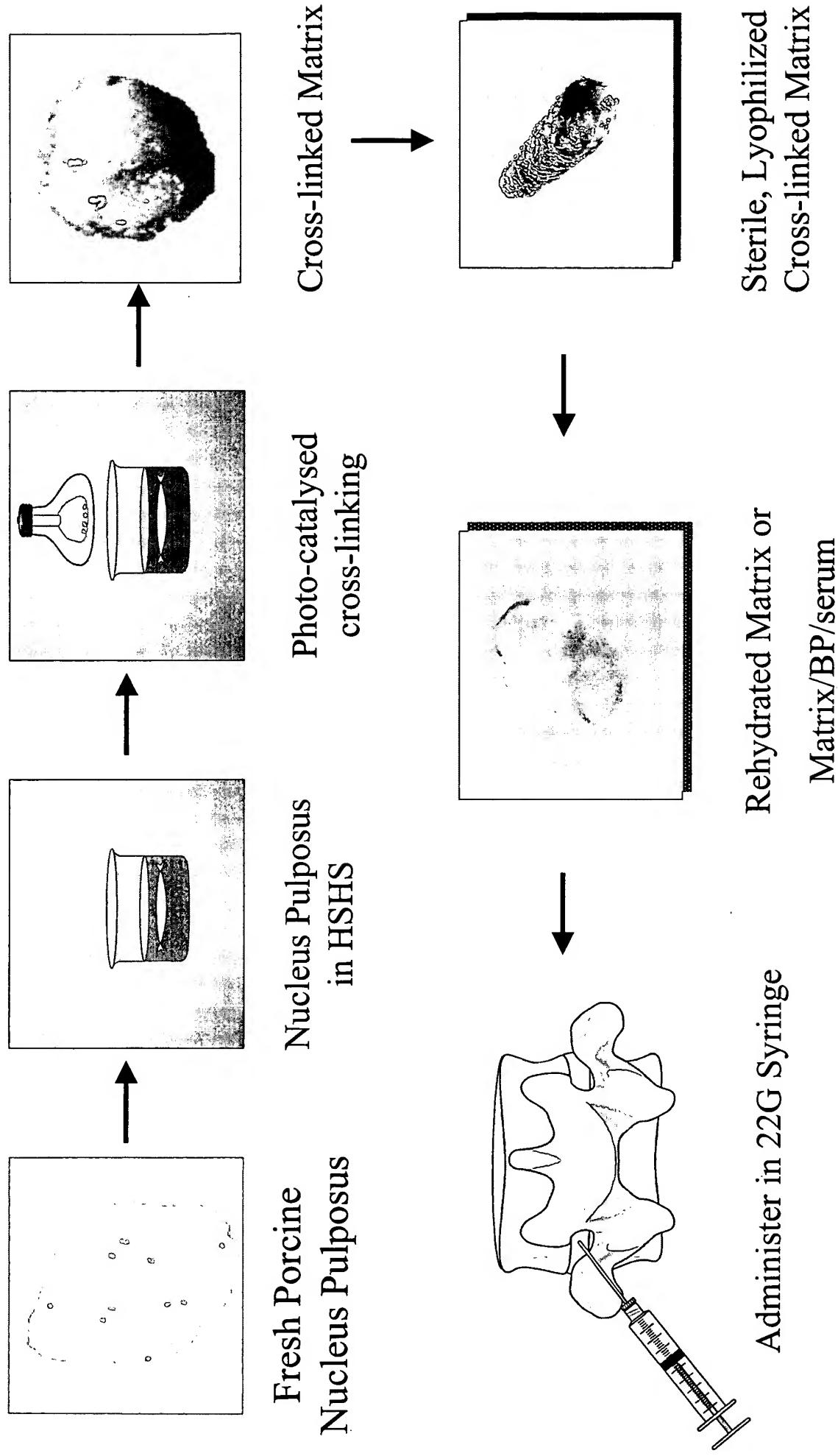


FIG. 3

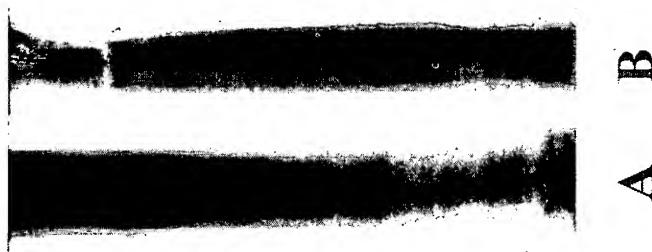
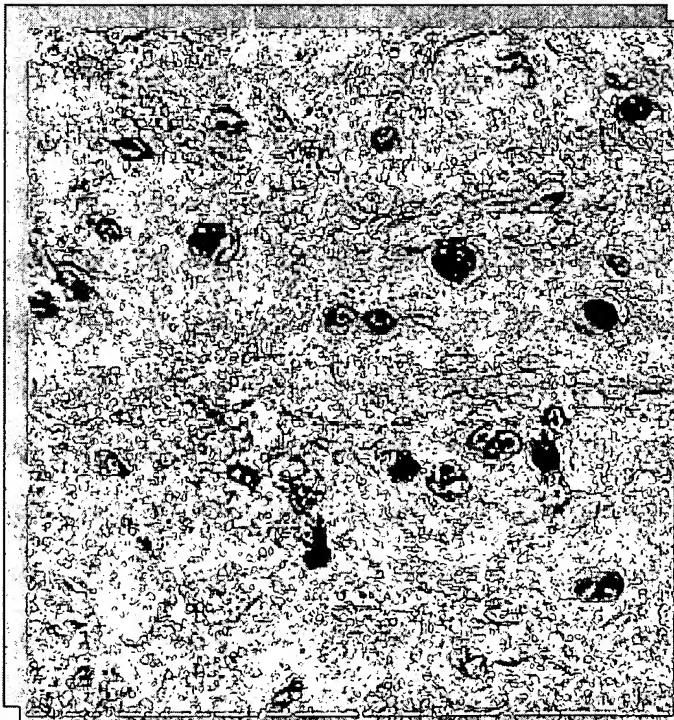
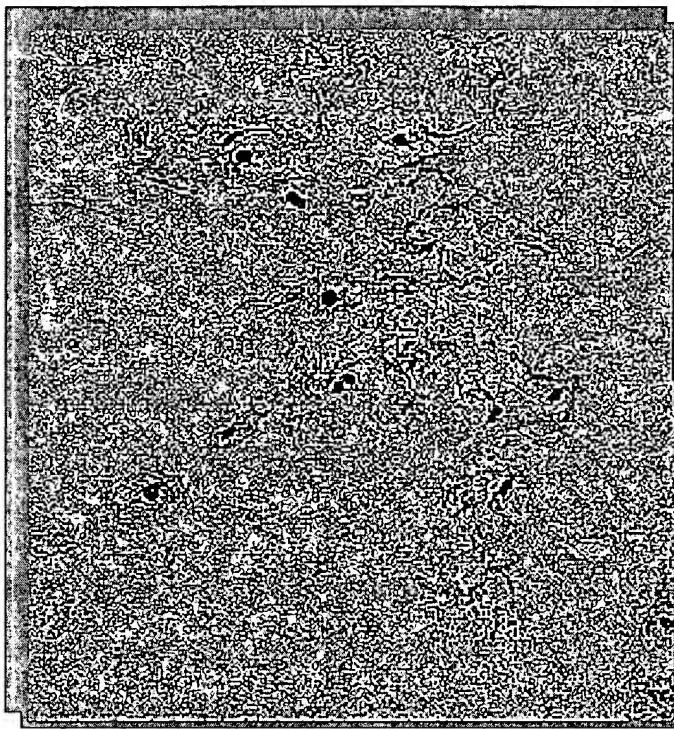


FIG. 4



Fresh Nucleus Pulposus



Cross-linked Matrix

FIG. 5

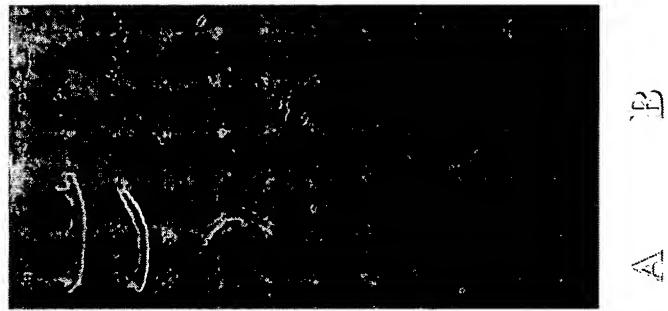


FIG. 6

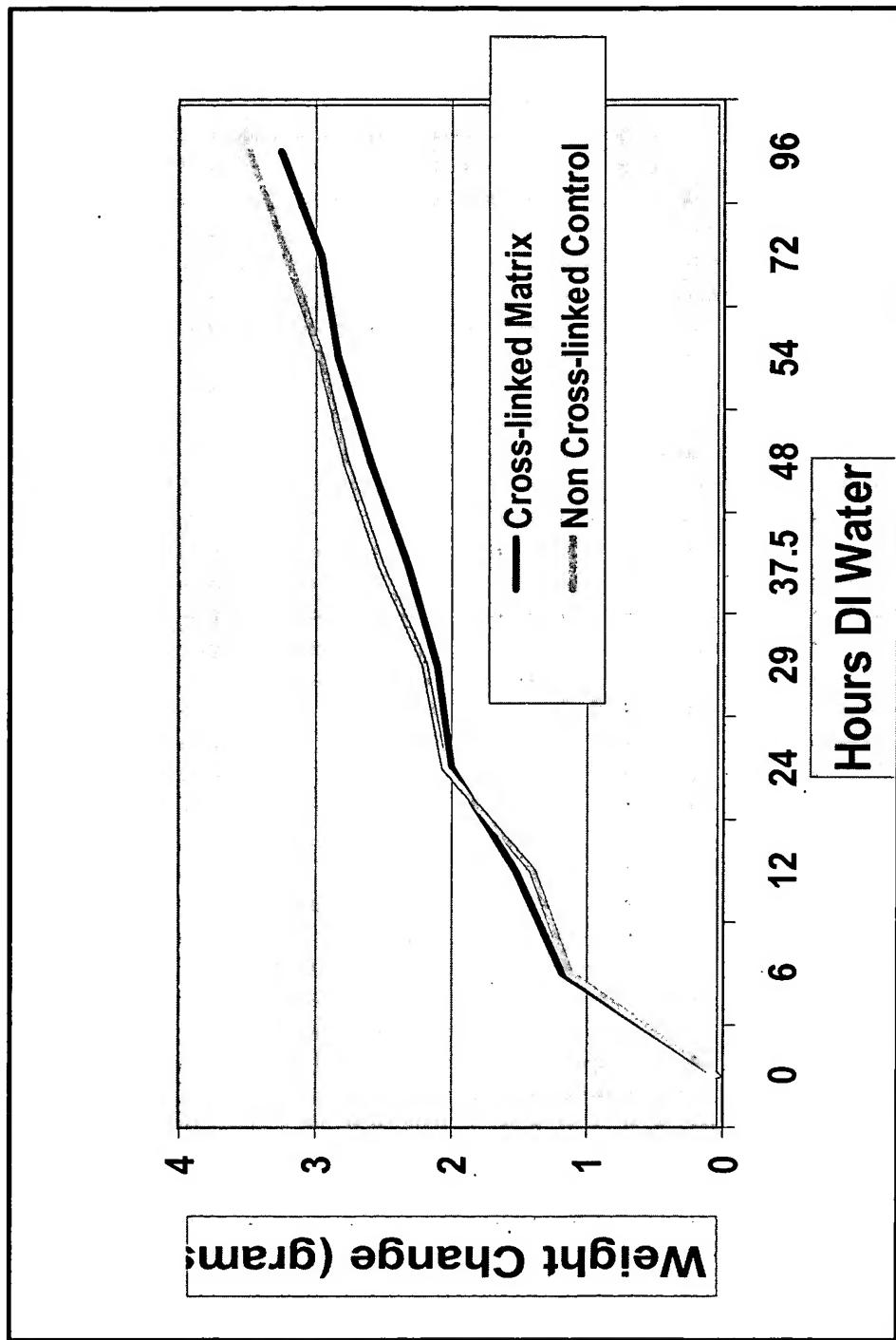
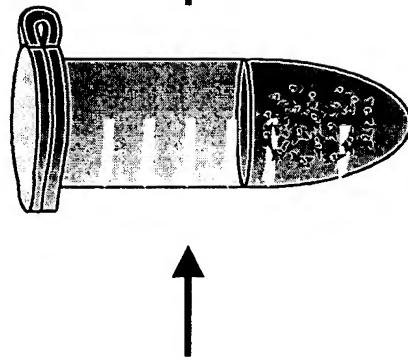


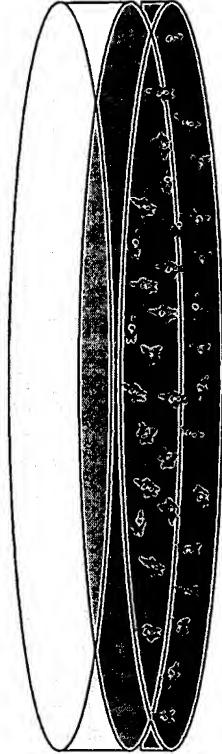
FIG. 7

Cell Isolation



Sterile nucleus pulposus  
from sheep spine;  
enzymatic digestion for  
cell isolation

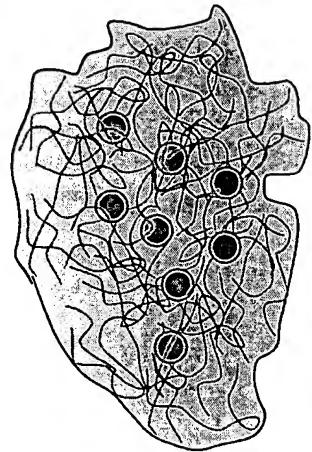
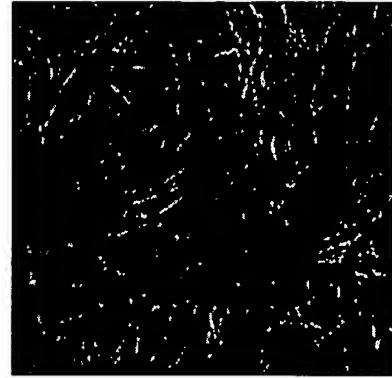
Culture Expansion



Cross-linked matrix/BP



Disc Cell Culture in  
Cross-linked Matrix/BP



Cross-linked  
matrix  
seeded with  
disc cells &  
stained with  
phalloidin

FIG. 8

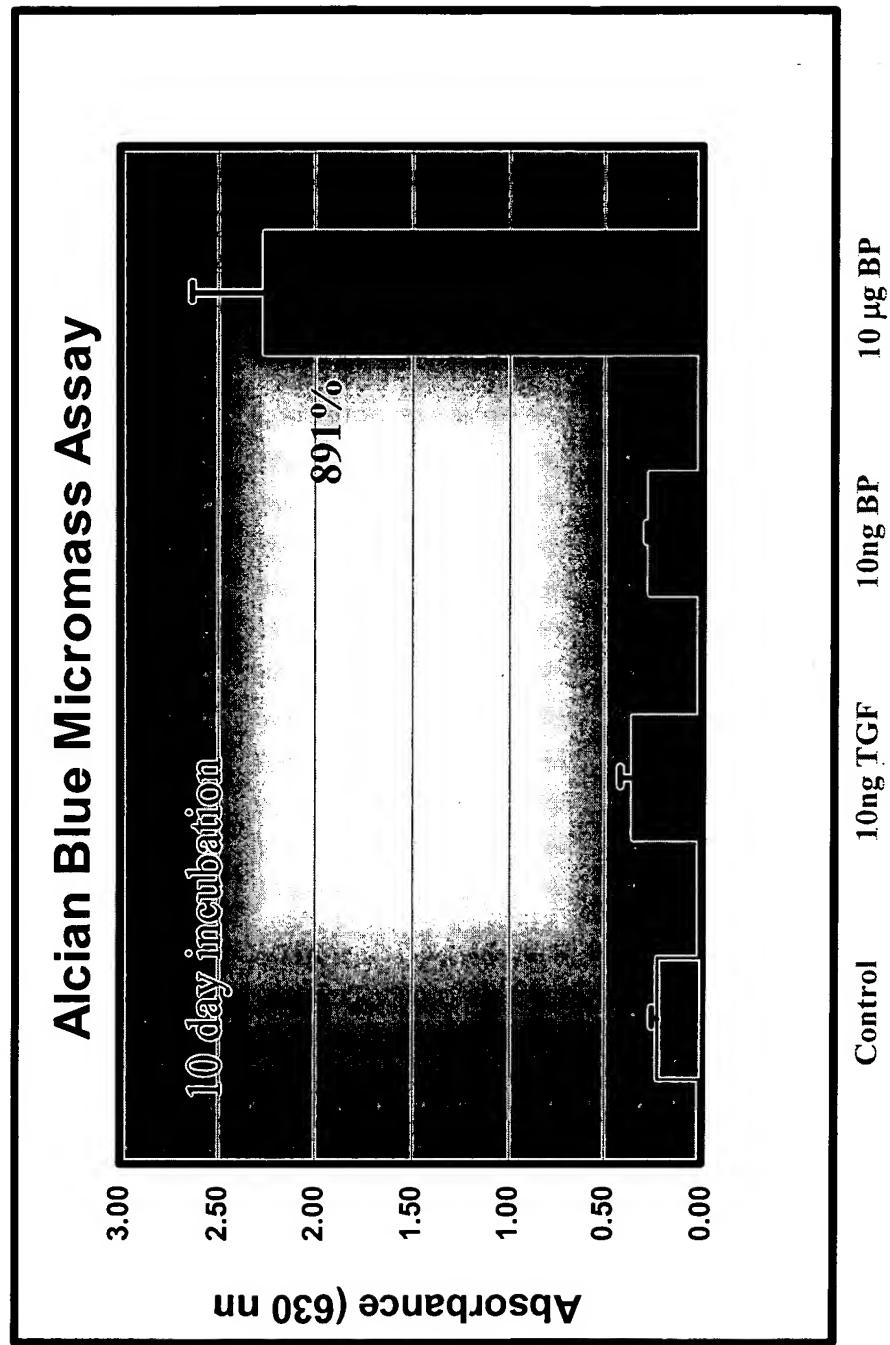


FIG. 9

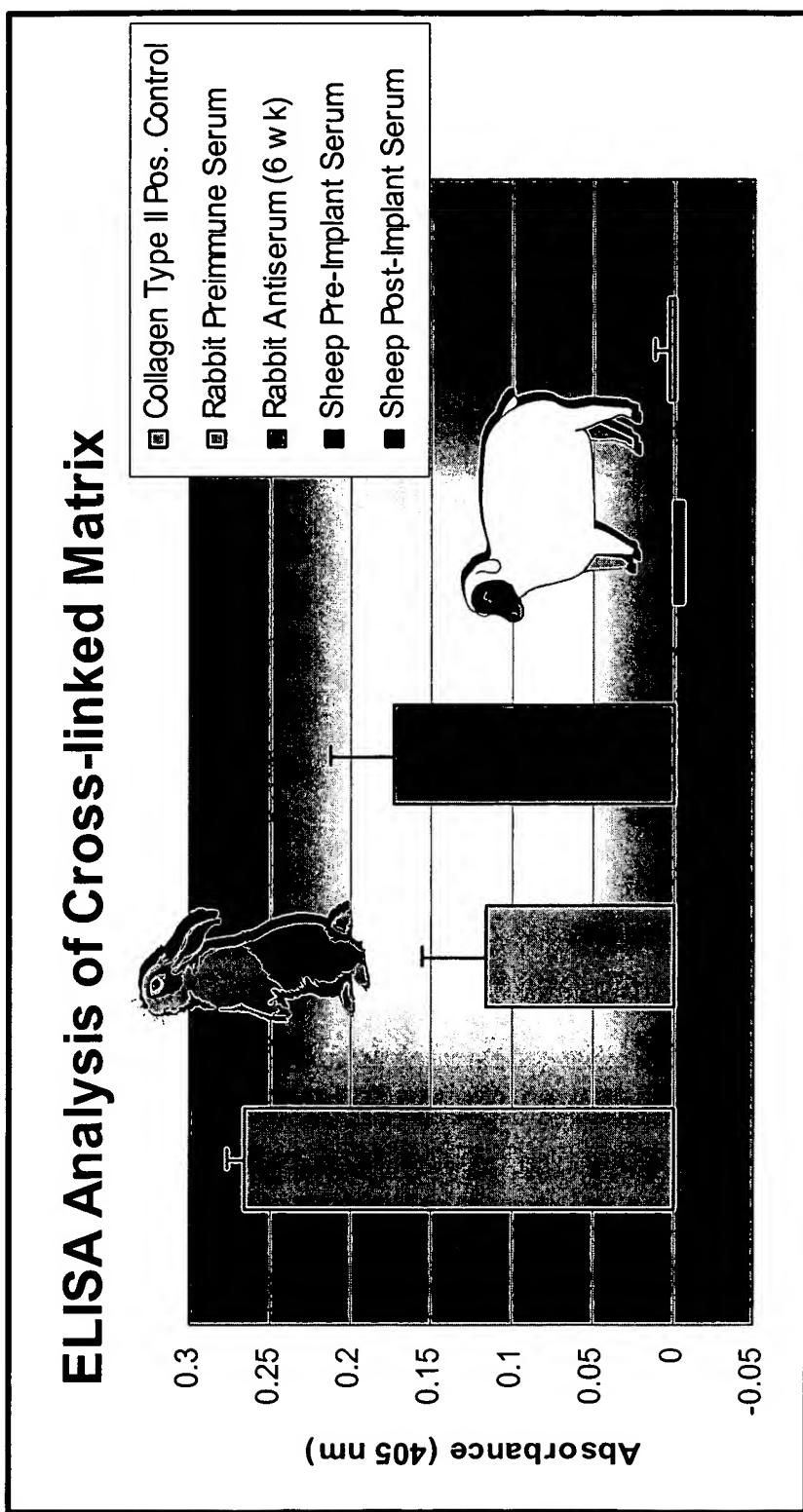
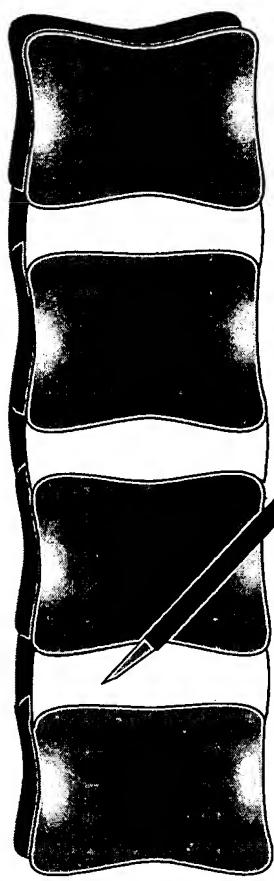


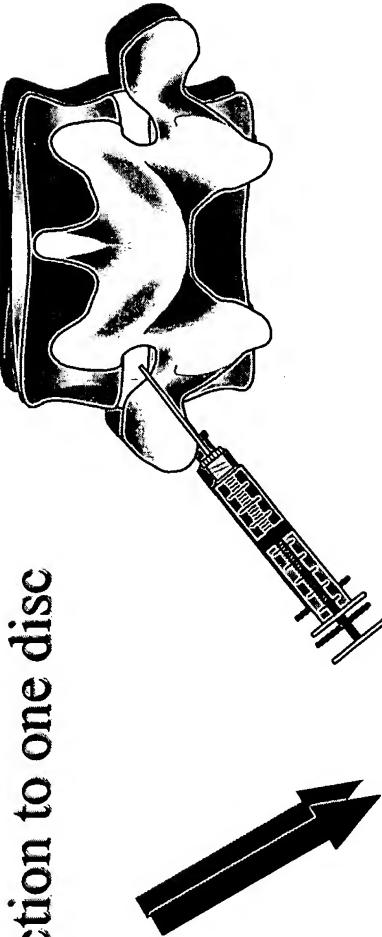
FIG. 10

**1st operation:** annulus stabs to  
create two degenerative discs



Wait 2 months

**2nd operation:** Cross-linked matrix/BP  
gel treatment injection to one disc



- Histomorphometry
- MRI/radiographs
- Immune response

Sacrifice: 2, 4, and 6 months

FIG. 11

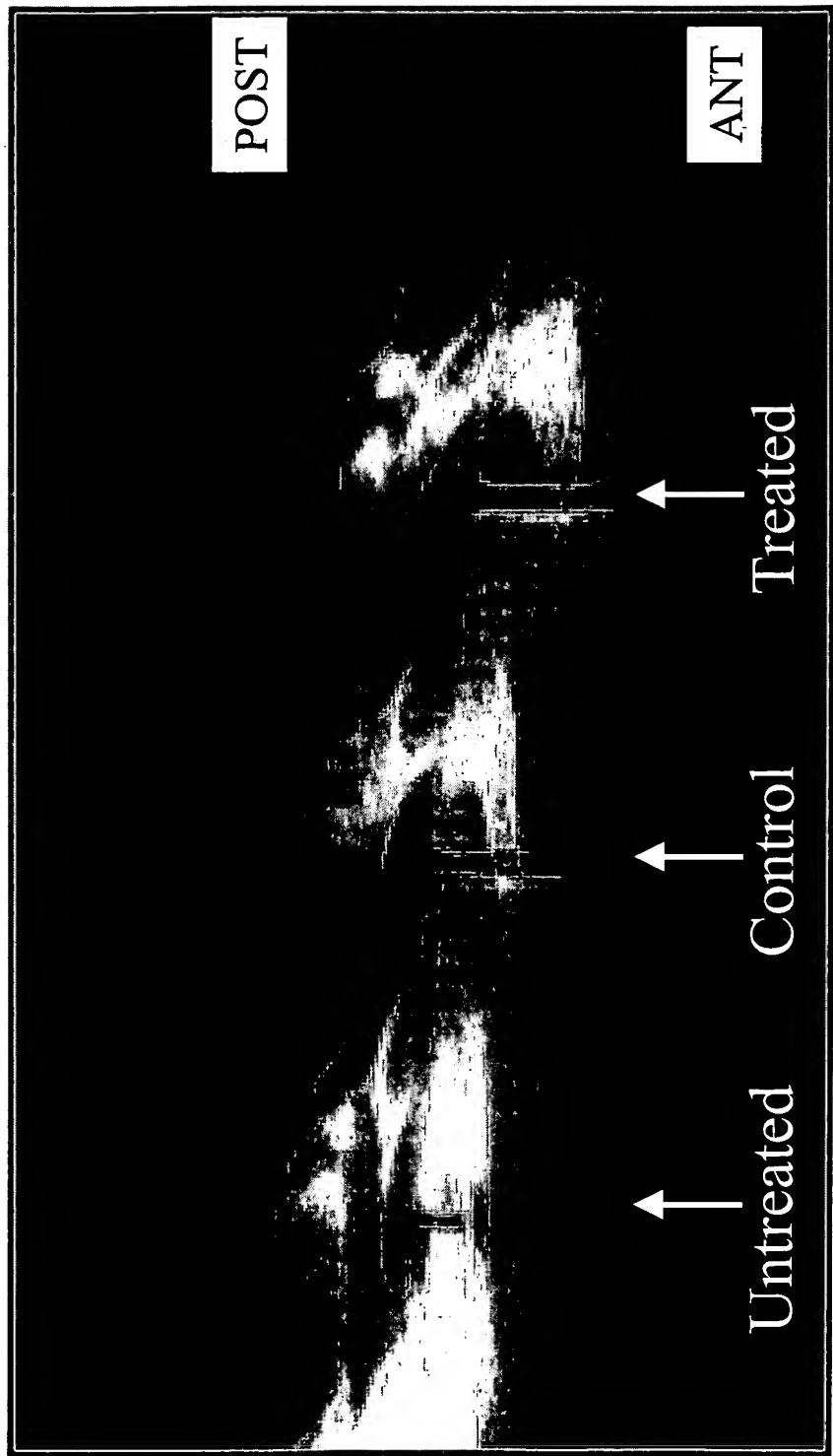
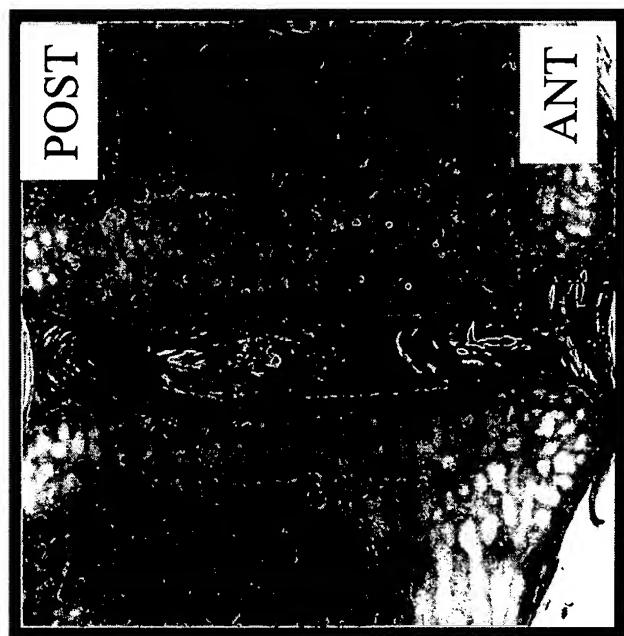


FIG. 12A



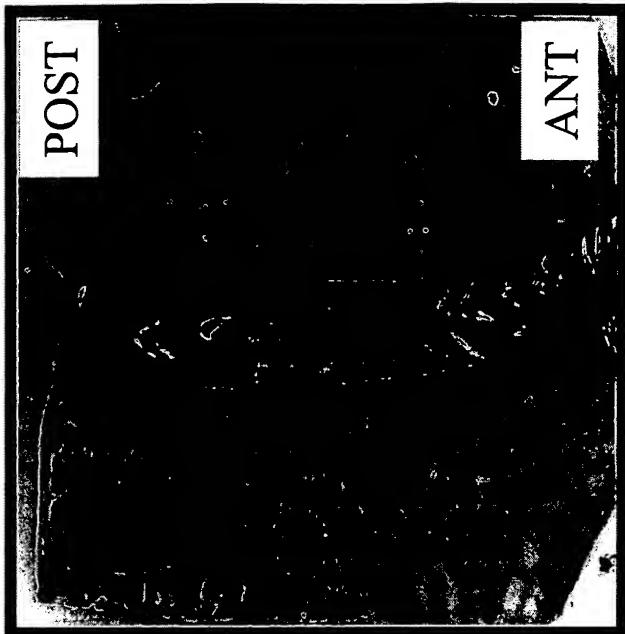
Untreated disc

FIG. 12B



Control

FIG. 12C



Treated disc

FIG. 13

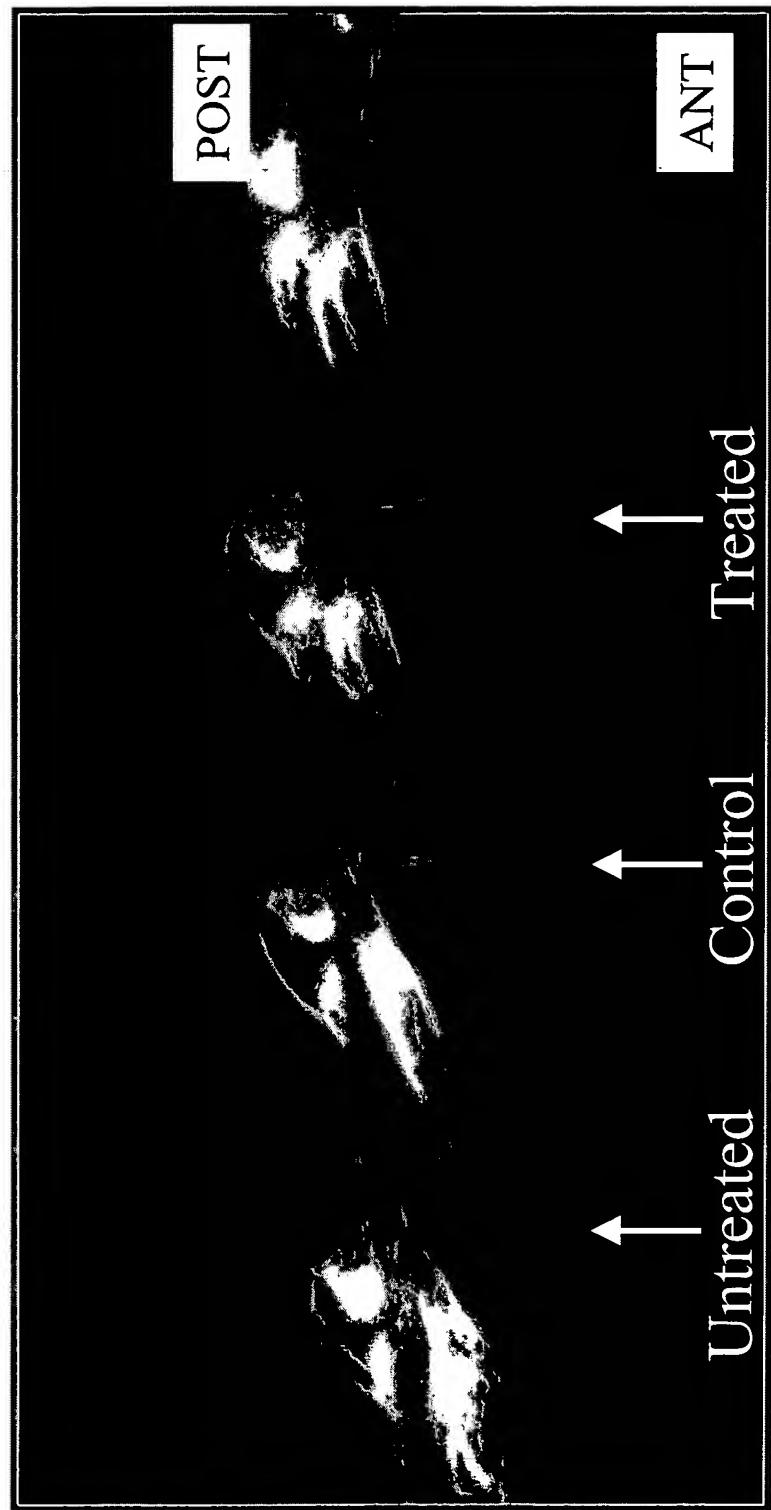


FIG. 14



Untreated

Control

Treated

FIG. 15A

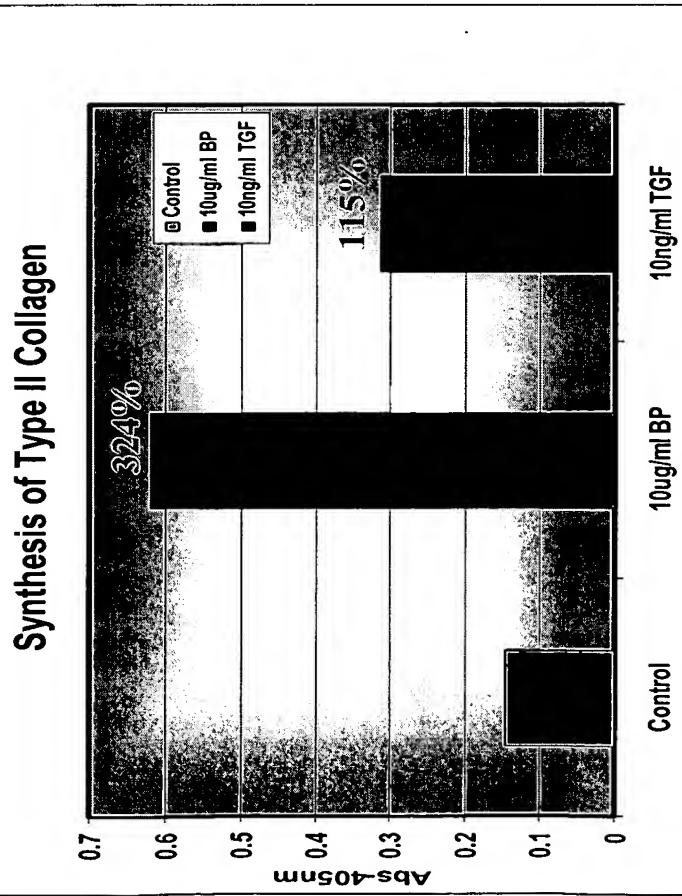
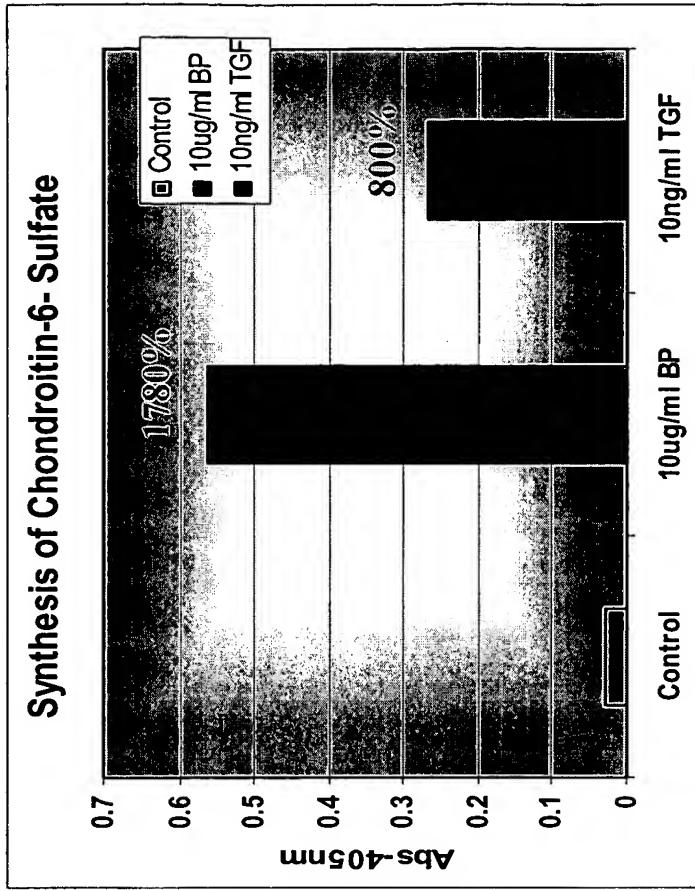
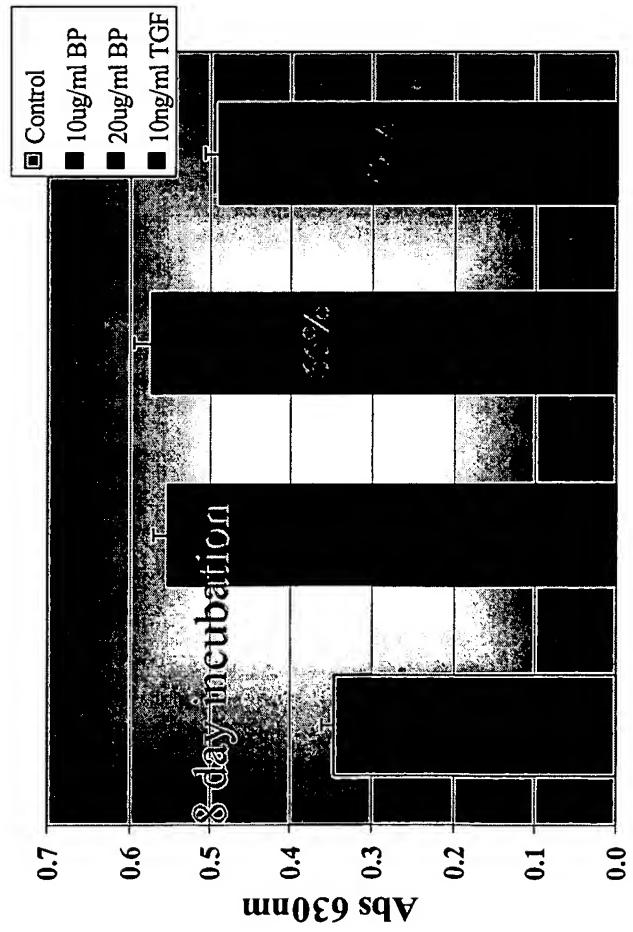


FIG. 15B



**FIG. 16A**  
Proteoglycan Synthesis in Human Disc Cells



**FIG. 16B**

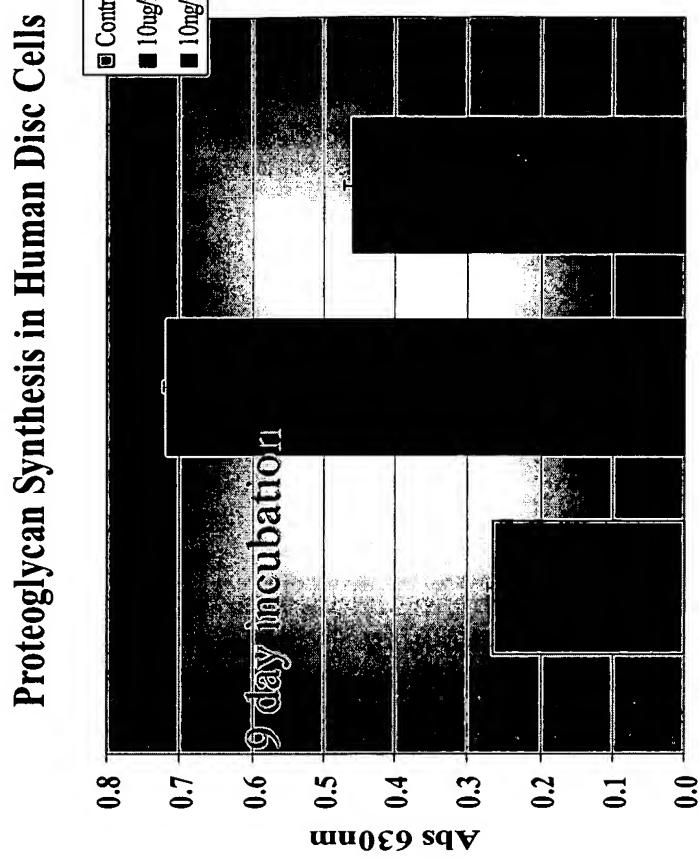


FIG. 17

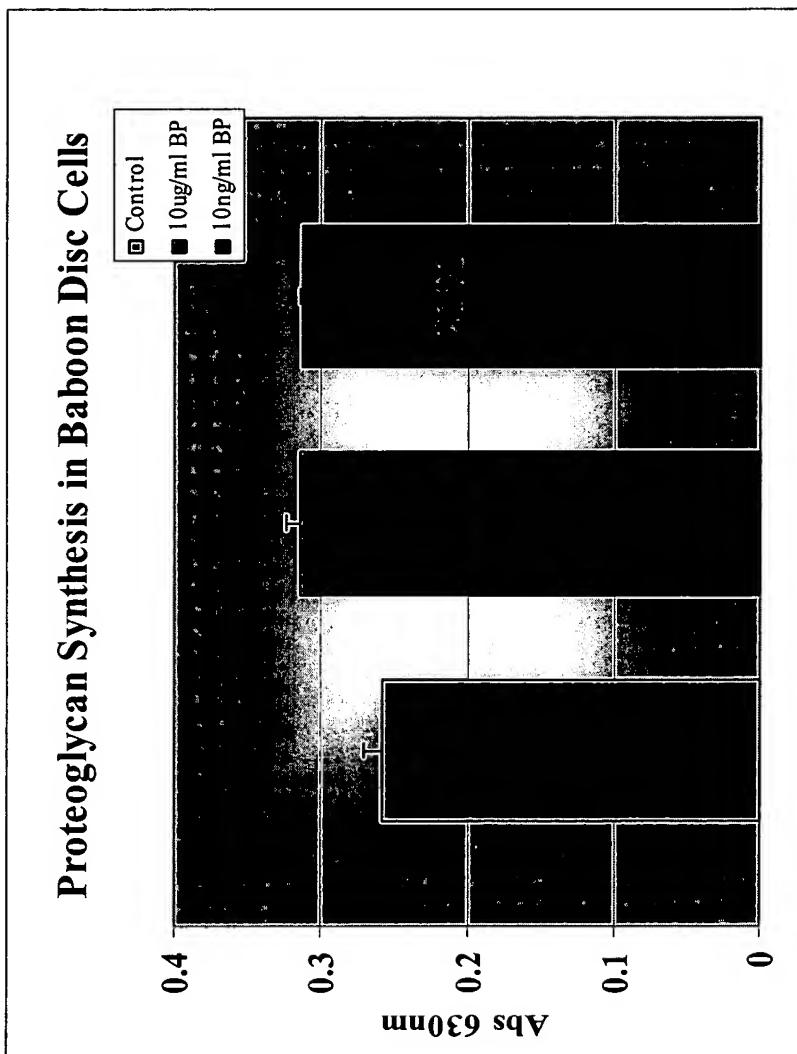


FIG. 18

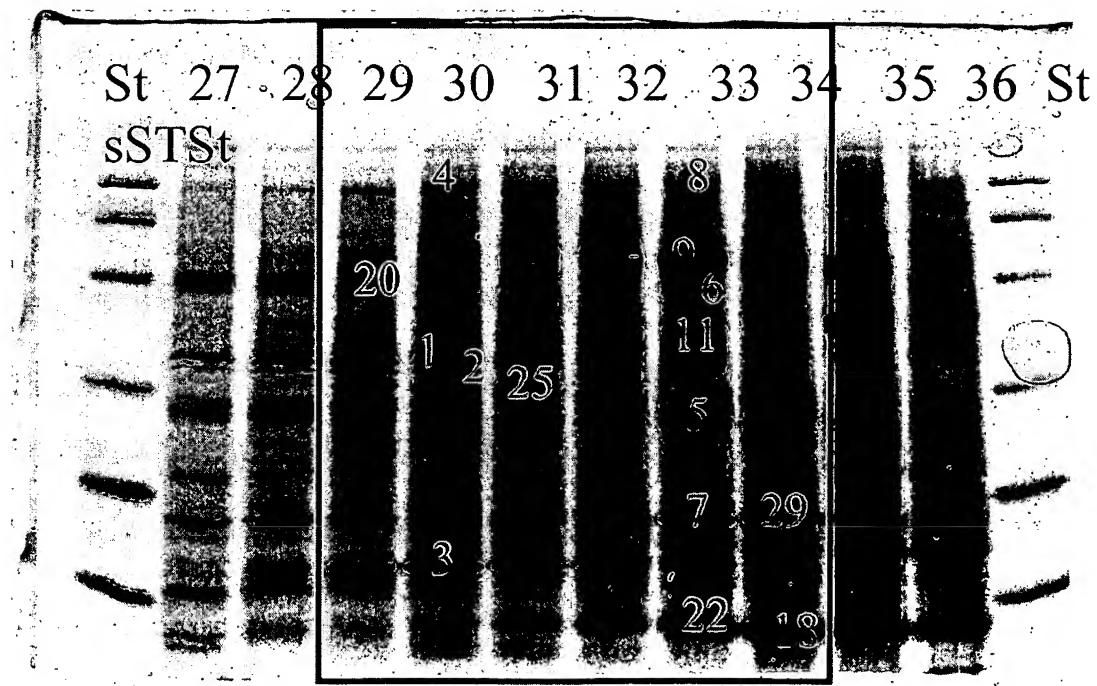
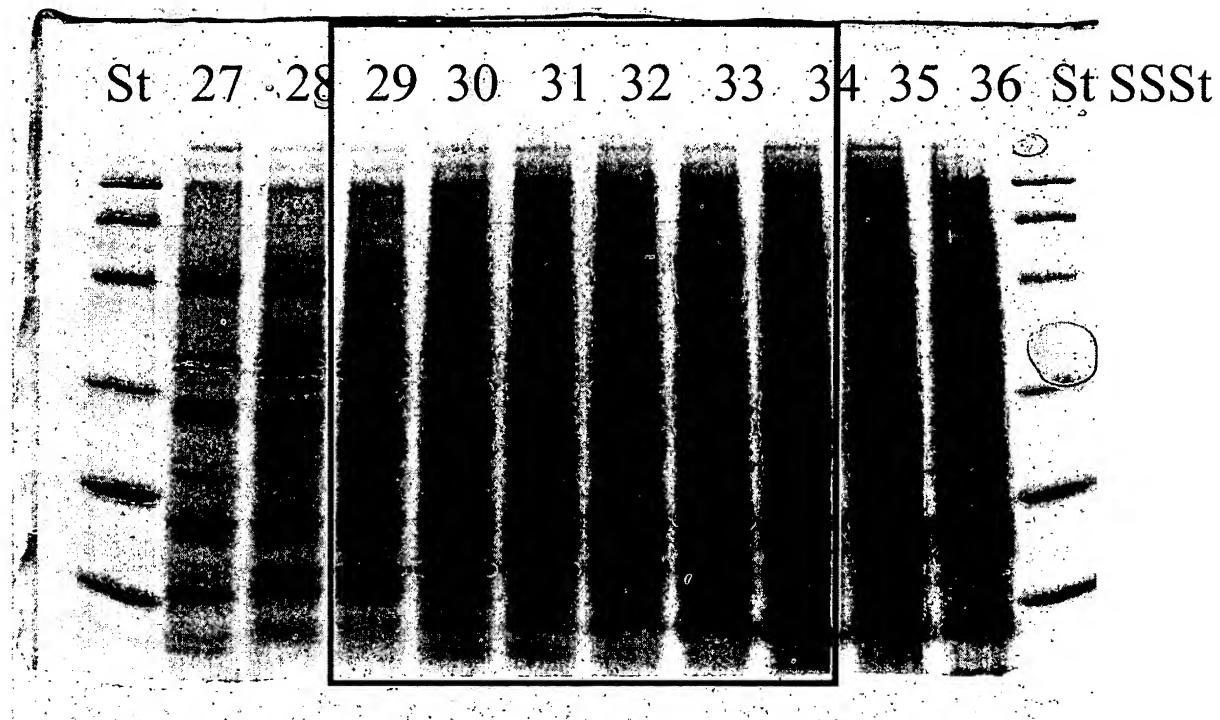
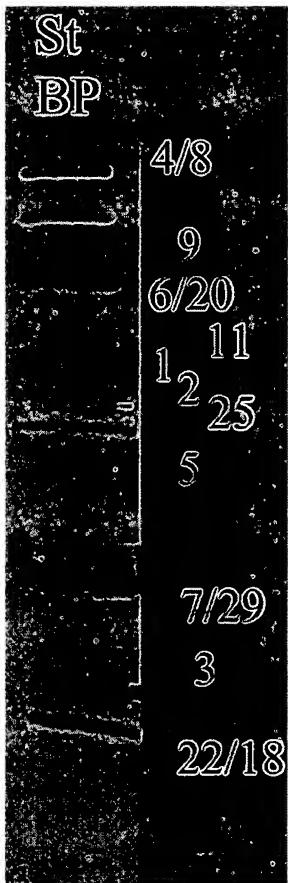
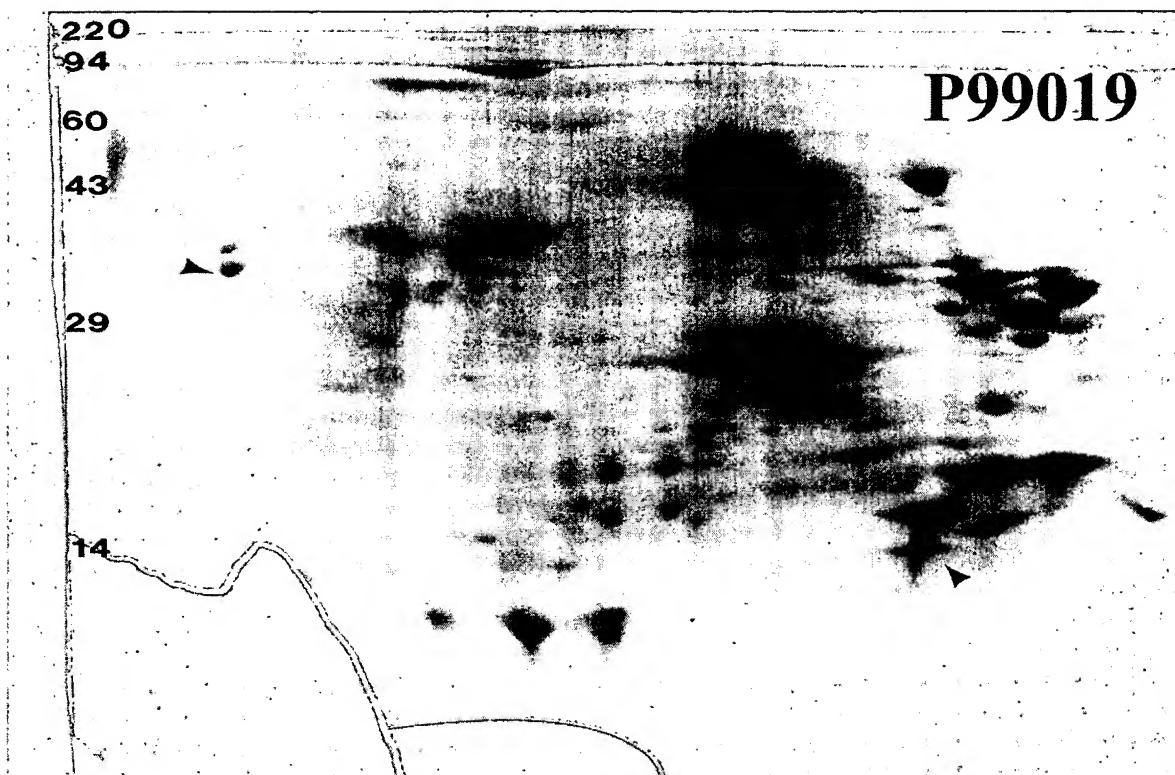


FIG. 19

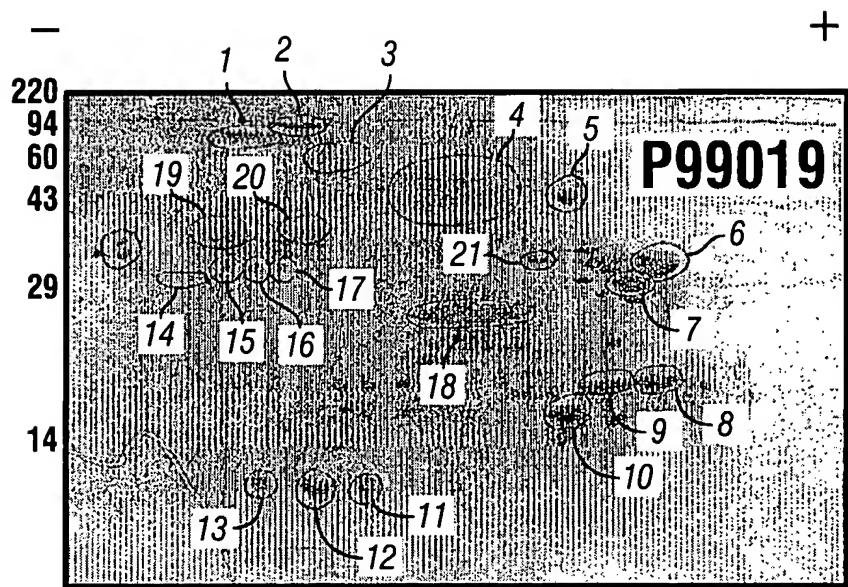


Band No.	Identity
1	Histone H1.c
2	Histone H1.c
3	Ribosomal protein RS20
4	Similar to ribosomal protein LORP
5	BMP-3
6	$\alpha$ 2 macroglobulin RAP and BMP-3
7	Similar to ribosomal protein LORP
8	BMP-3
9	BMP-3
11	Ribosomal protein RL6 and BMP-3
18	TGF- $\beta$ 2 / SPP 24
20	Factor H
22	TGF- $\beta$ 2
25	BMP-3 and H1.x
29	BMP-3 and ribosomal protein RL32

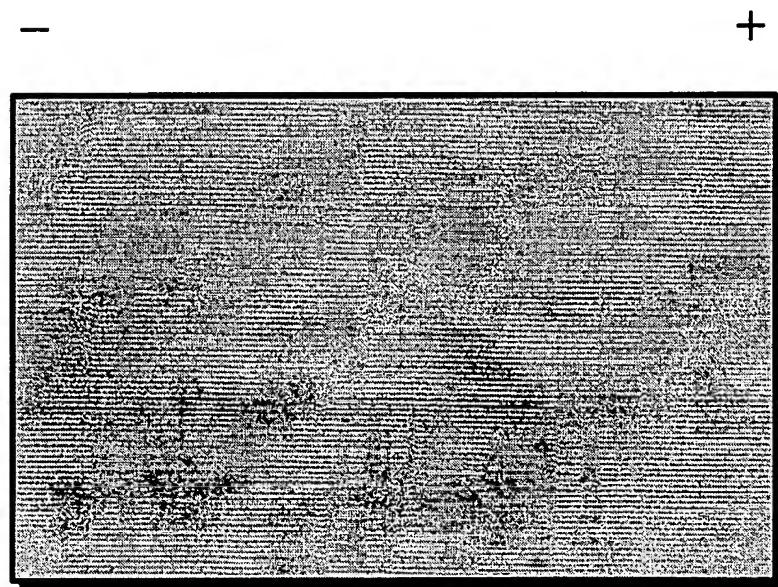
FIG. 20



**FIG. 21**



**FIG. 22**



**FIG. 24**

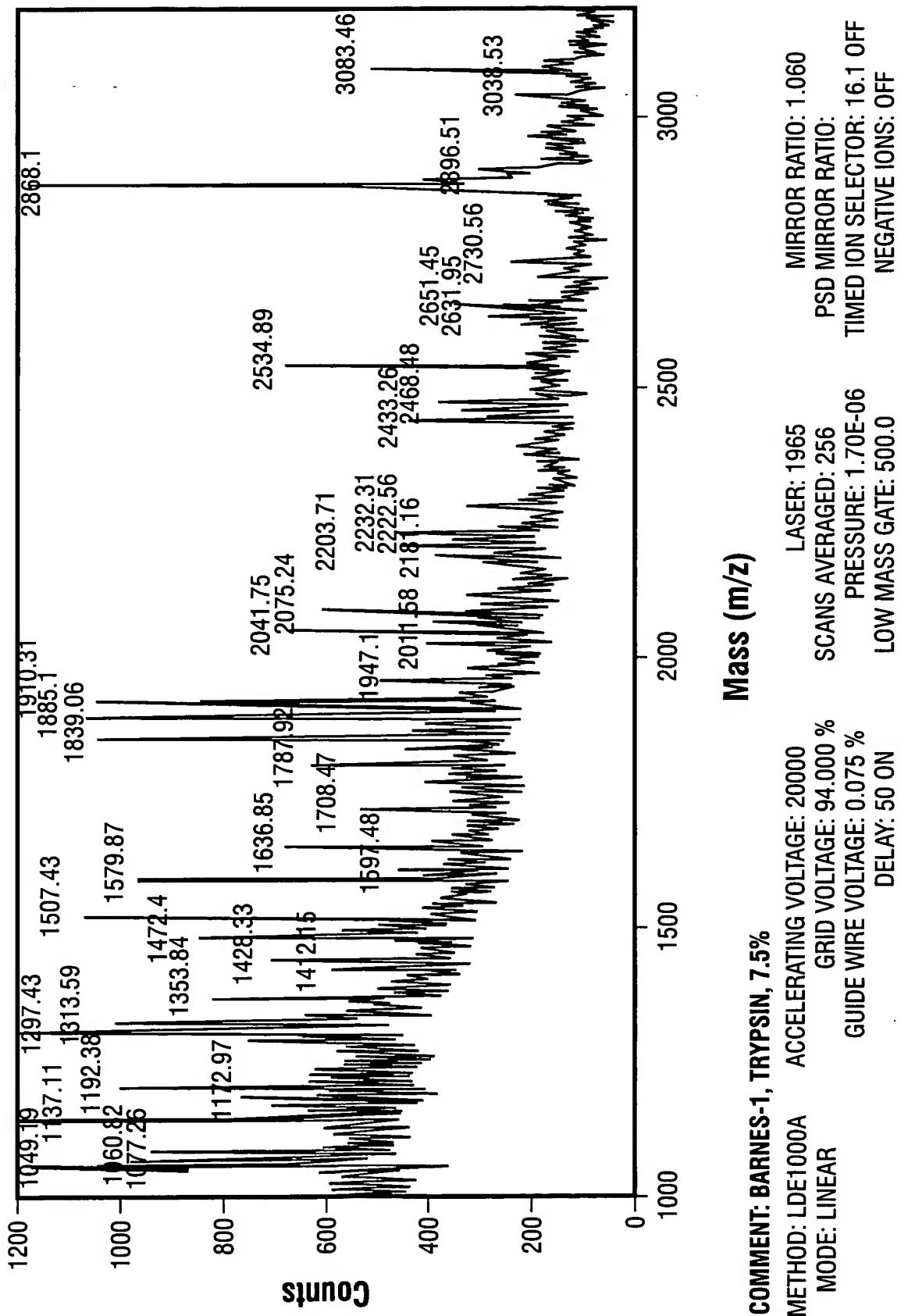
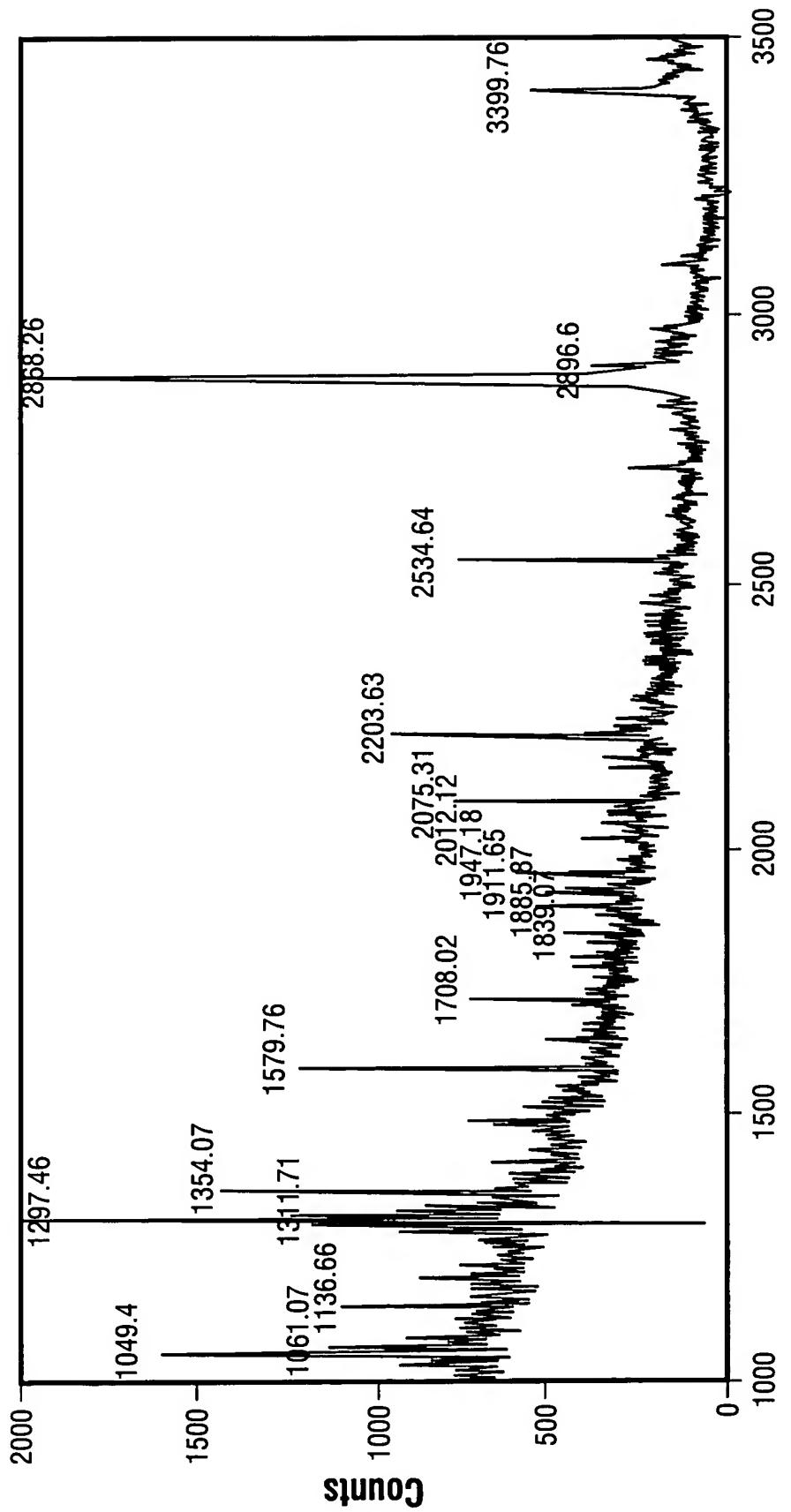


FIG. 23A (Band 1)



COMMENT: BARNES-2, TRYPSIN, 7.5%

METHOD: LDE1000A    ACCELERATING VOLTAGE: 20000  
 MODE: LINEAR    GRID VOLTAGE: 94.000 %  
 GUIDE WIRE VOLTAGE: 0.075 %    SCANS AVERAGED: 256  
 DELAY: 50 ON    LASER: 1965  
 LOW MASS GATE: 500.0    PRESSURE: 1.58E-06

MIRROR RATIO: 1.060  
 PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

Mass (m/z)

FIG. 23B (Band 2)

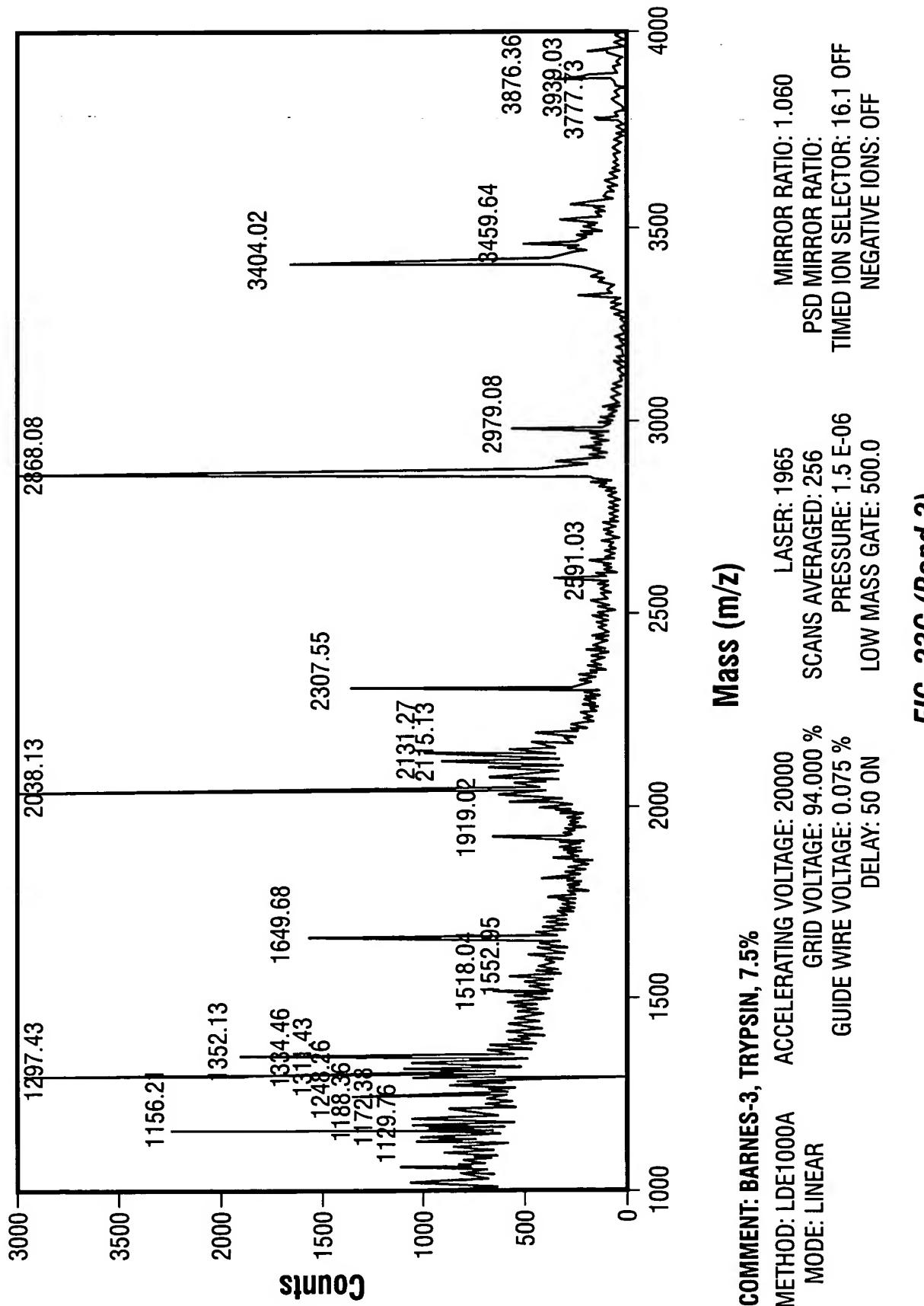
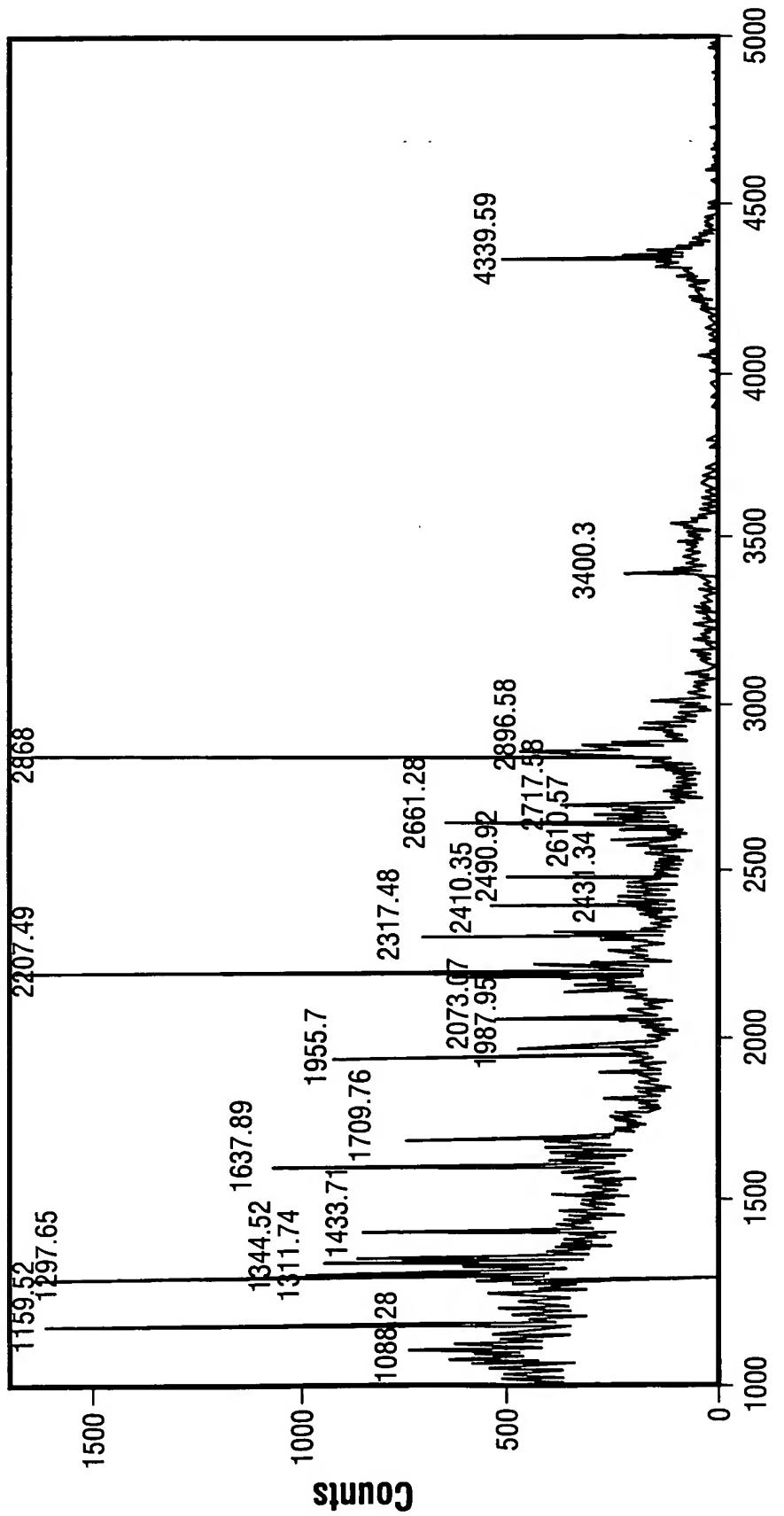


FIG. 23C (Band 3)



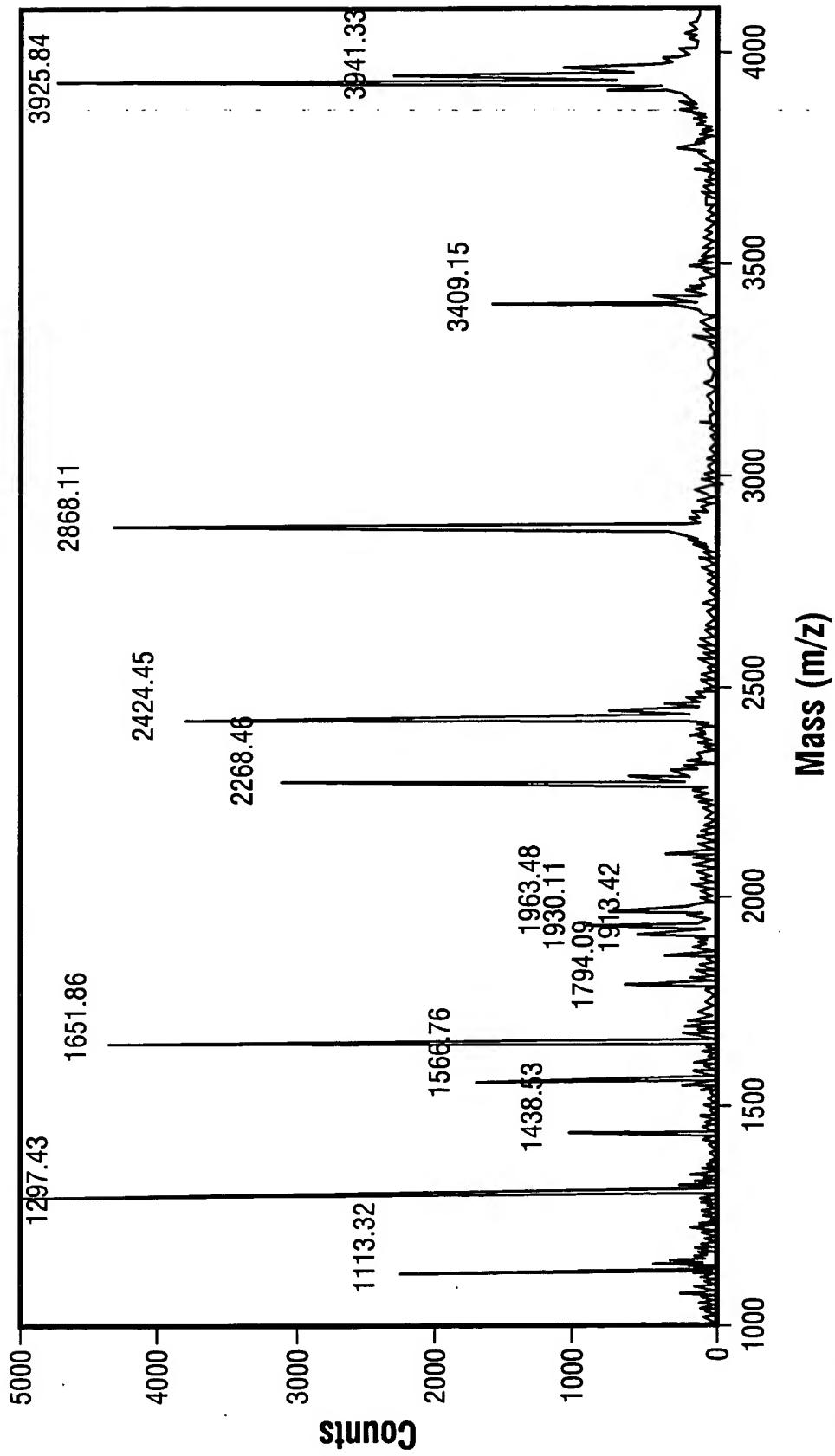
COMMENT: BARNES-4, TRY5, 5%

METHOD: LDE1000A    ACCELERATING VOLTAGE: 20000  
 MODE: LINEAR    GRID VOLTAGE: 94.000 %  
 GUIDE WIRE VOLTAGE: 0.075 %  
 DELAY: 50 ON

LASER: 1965    SCANS AVERAGED: 256  
 PRESSURE: 9.04E-07    LOW MASS GATE: 500.0

MIRROR RATIO: 1.060  
 PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

FIG. 23D (Band 4)



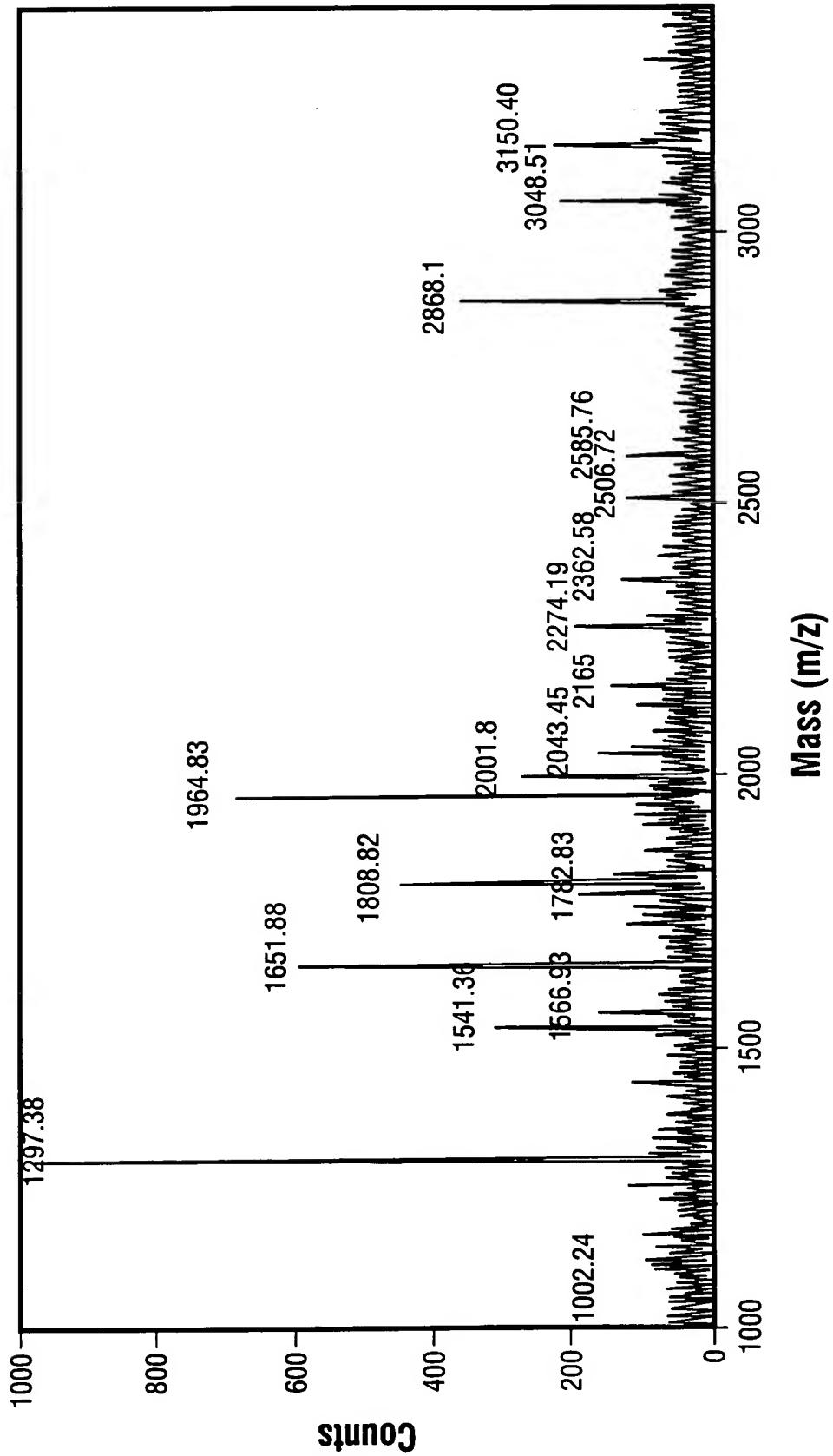
COMMENT: BARNES TRYPS #5

METHOD: LDE1000A    ACCELERATING VOLTAGE: 20000  
 MODE: LINEAR    GRID VOLTAGE: 94.000 %    SCANS AVERAGED: 121  
 GUIDE WIRE VOLTAGE: 0.075 %    PRESSURE: 3.68E-07  
 DELAY: 50 ON    LOW MASS GATE: 500.0

LASER: 1965  
 PSD MIRROR RATIO: 1.060  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

MIRROR RATIO: 1.060  
 PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

FIG. 23E (Band 5)

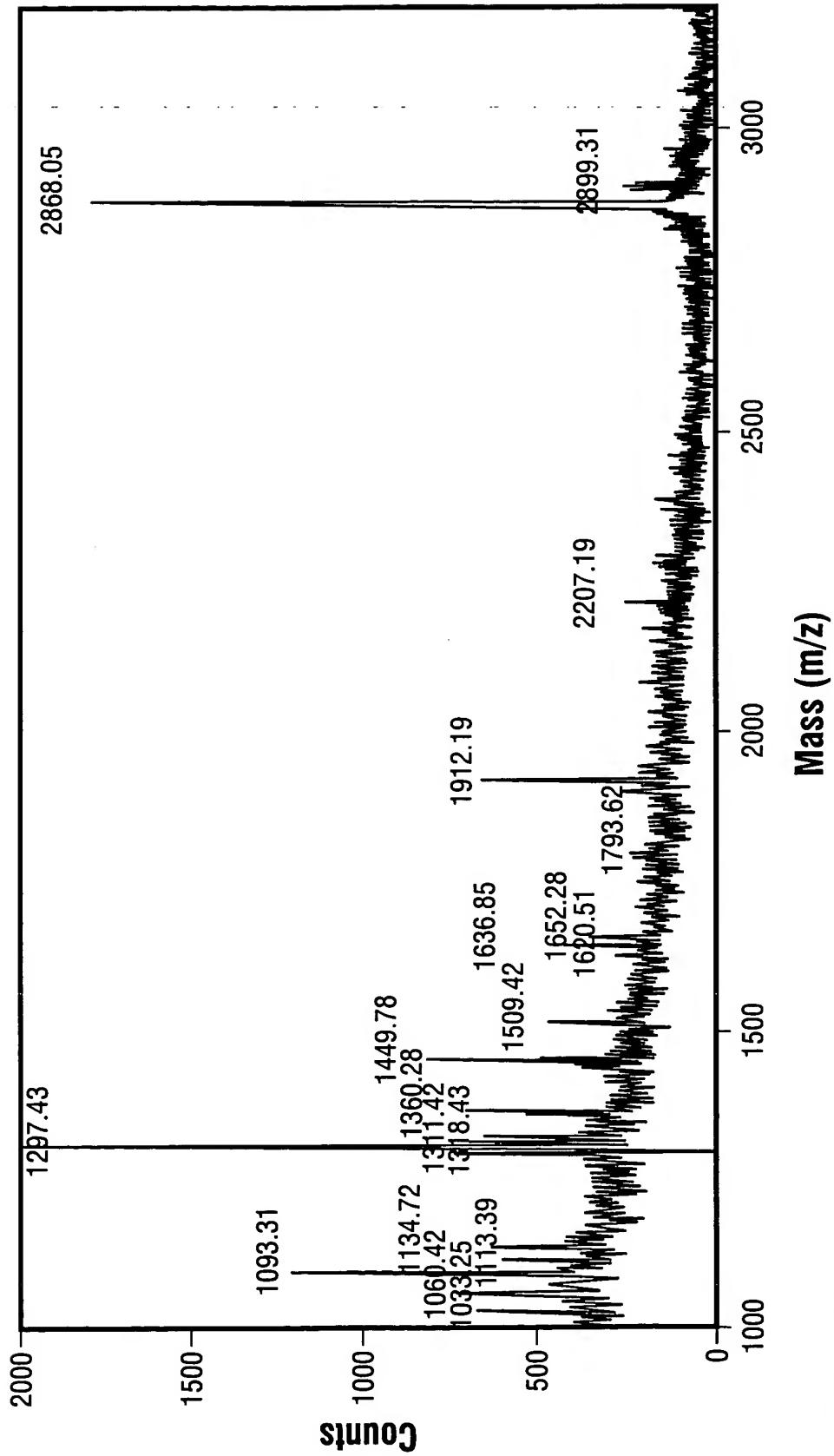


COMMENT: BARNES TRYPS #6

METHOD: LDE1000A      ACCELERATING VOLTAGE: 20000  
 MODE: LINEAR      GRID VOLTAGE: 94.000 %  
 GUIDE WIRE VOLTAGE: 0.075 %      SCANS AVERAGED: 256  
 DELAY: 50 ON      PRESSURE: 4.06E-07  
 LOW MASS GATE: 500.0

LASER: 1965      MIRROR RATIO: 1.060  
 PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

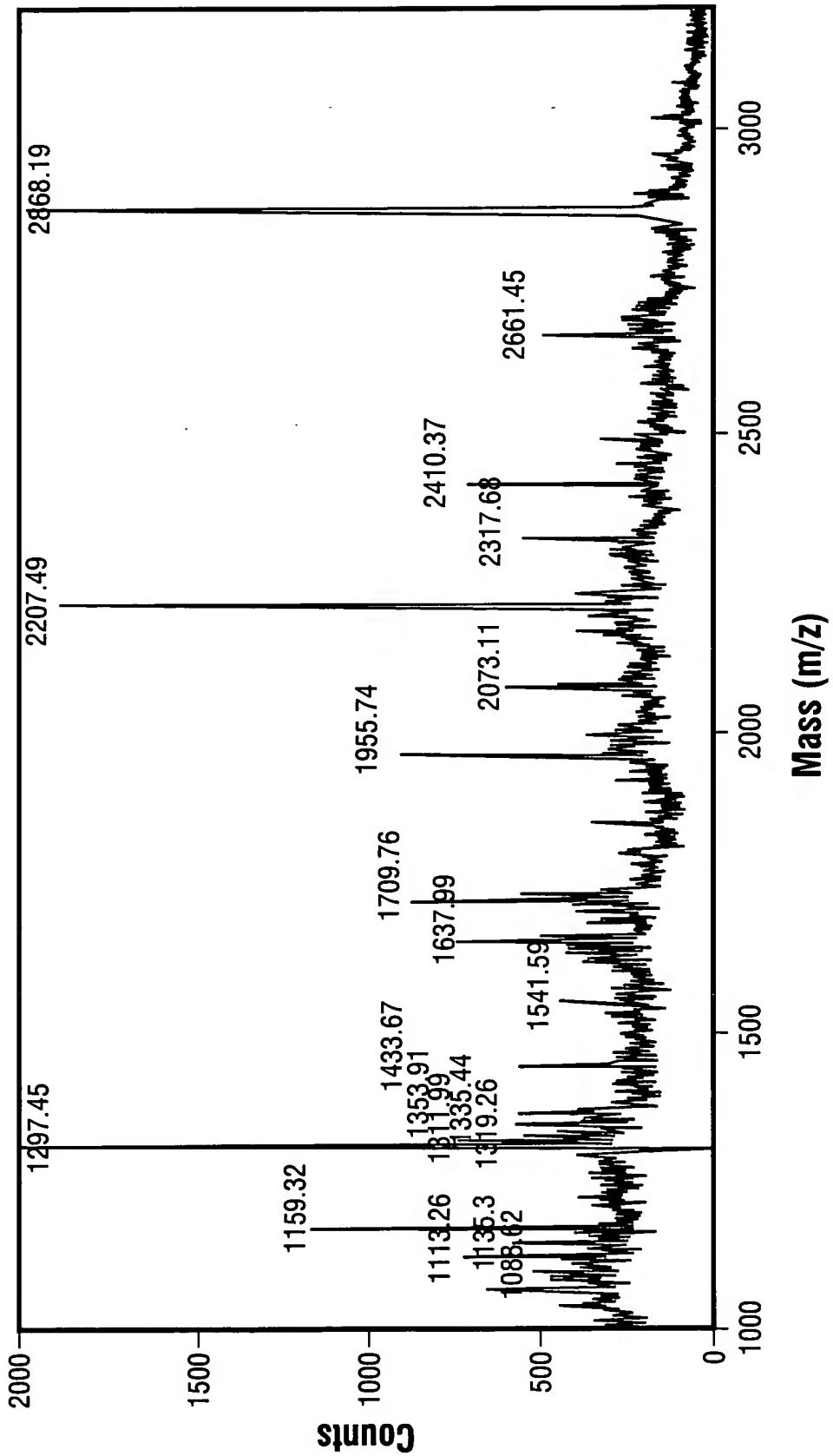
FIG. 23F (Band 6)



**COMMENT: BARNES-7, TRYp, 7.5%.**

METHOD: LDE1000A   ACCELERATING VOLTAGE: 20000   LASER: 1965  
 MODE: LINEAR   GRID VOLTAGE: 94.000 %   SCANS AVERAGED: 256  
 GUIDE WIRE VOLTAGE: 0.075 %   PRESSURE: 5.89E-07  
 DELAY: 50 ON   LOW MASS GATE: 500.0   TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF   PSD MIRROR RATIO: 1.060

**FIG. 23G (Band 7)**



COMMENT: BARNES-8, TRYPSIN, 7.5%

METHOD: LDE1000A    ACCELERATING VOLTAGE: 20000  
 MODE: LINEAR    GRID VOLTAGE: 94.000 %  
                   GUIDE WIRE VOLTAGE: 0.075 %  
                   DELAY: 50 ON

LASER: 1965    SCANS AVERAGED: 256  
                   PRESSURE: 4.01E-07    LOW MASS GATE: 500.0

MIRROR RATIO: 1.060  
 PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

FIG. 23H (Band 8)

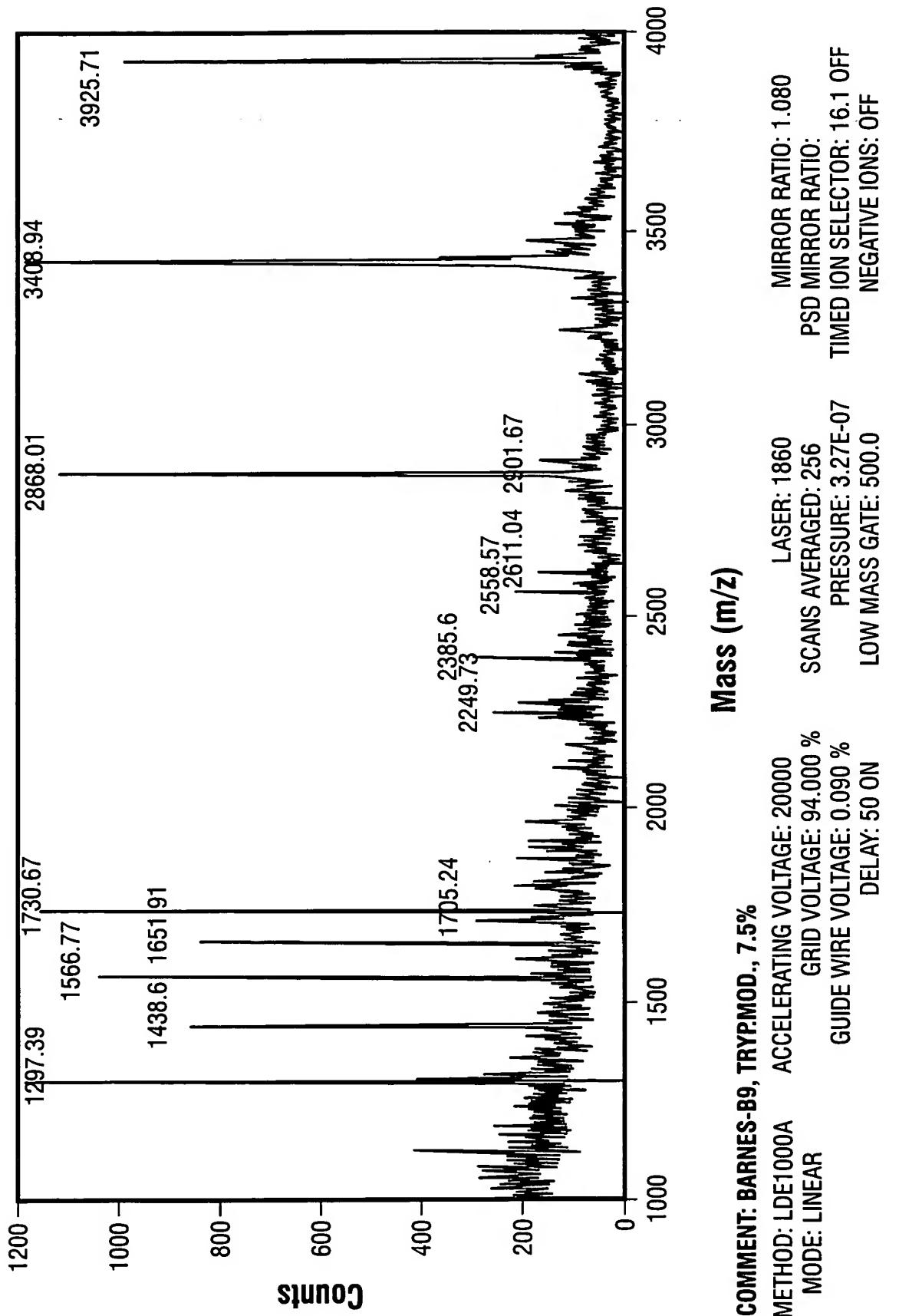


FIG. 231 (Band 9)

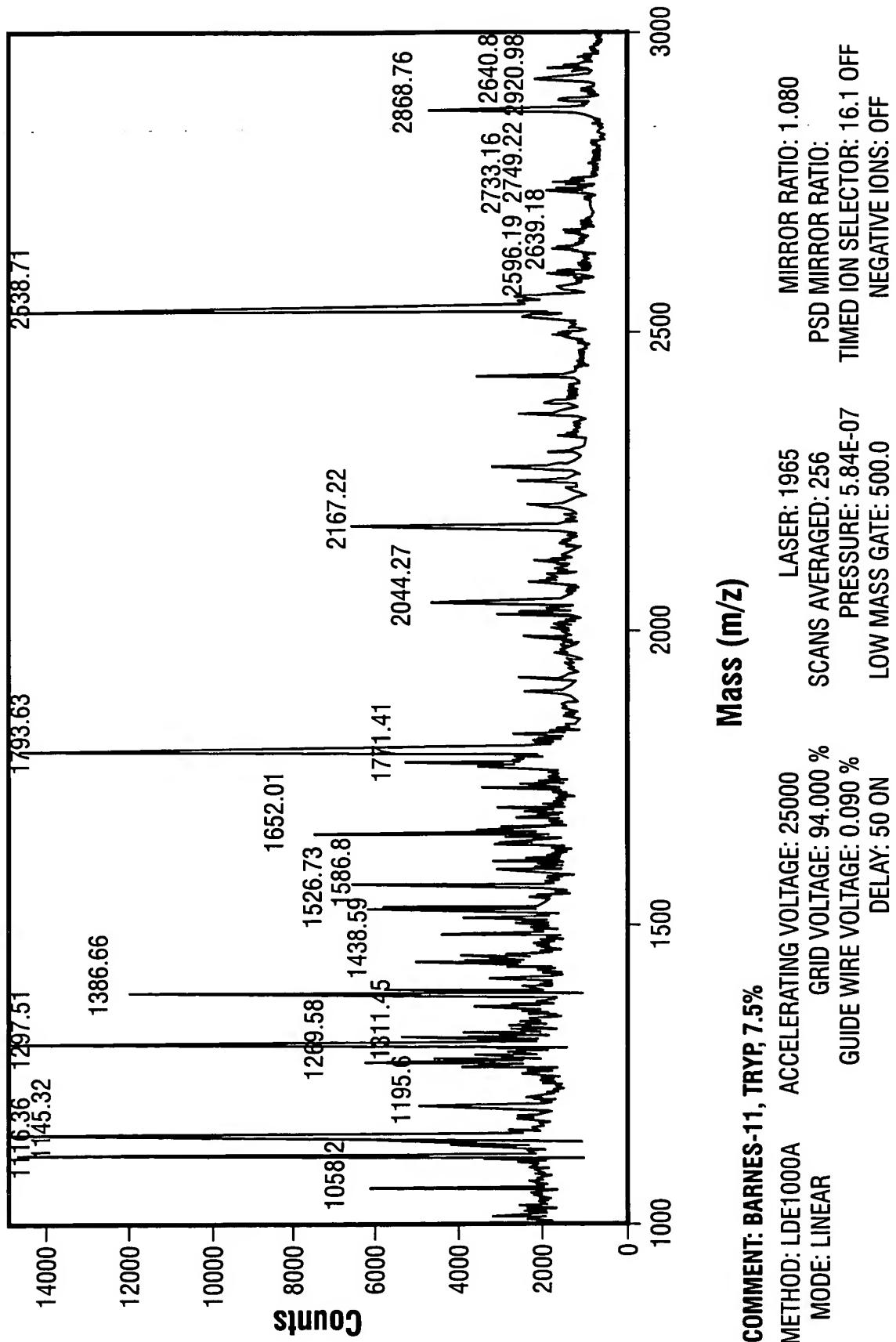
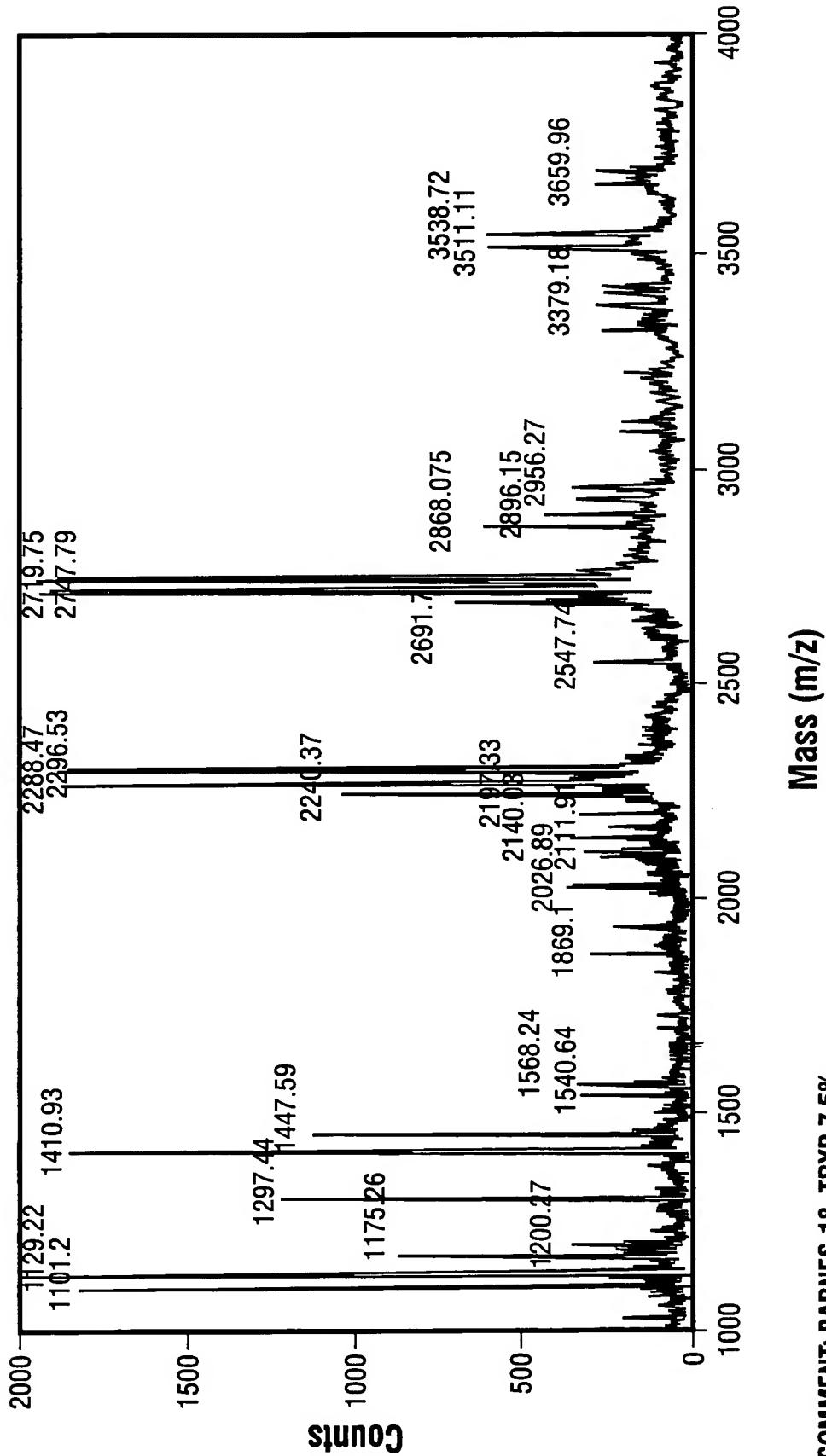


FIG. 23J (Band 11)



COMMENT: BARNES-18, TRYPT, 7.5%

METHOD: LDE1000A    ACCELERATING VOLTAGE: 25000  
 MODE: LINEAR    GRID VOLTAGE: 94.000 %  
 GUIDE WIRE VOLTAGE: 0.090 %  
 DELAY: 50 ON

LASER: 1745    SCANS AVERAGED: 256  
 PRESSURE: 2.90E-07    LOW MASS GATE: 500.0

MIRROR RATIO: 1.080    PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

Mass (m/z)

FIG. 23K (Band 18)

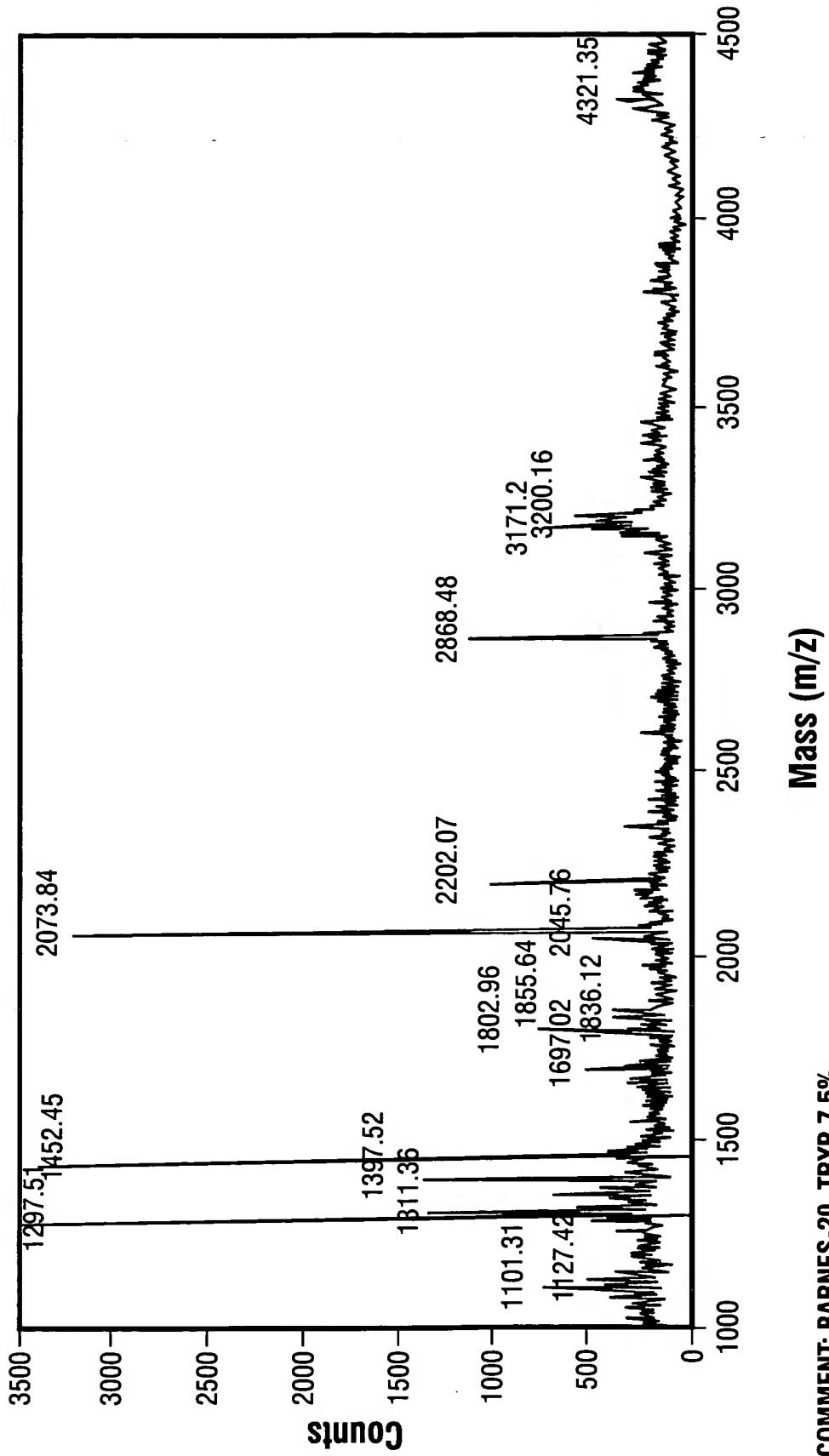


FIG. 23L (Band 20)

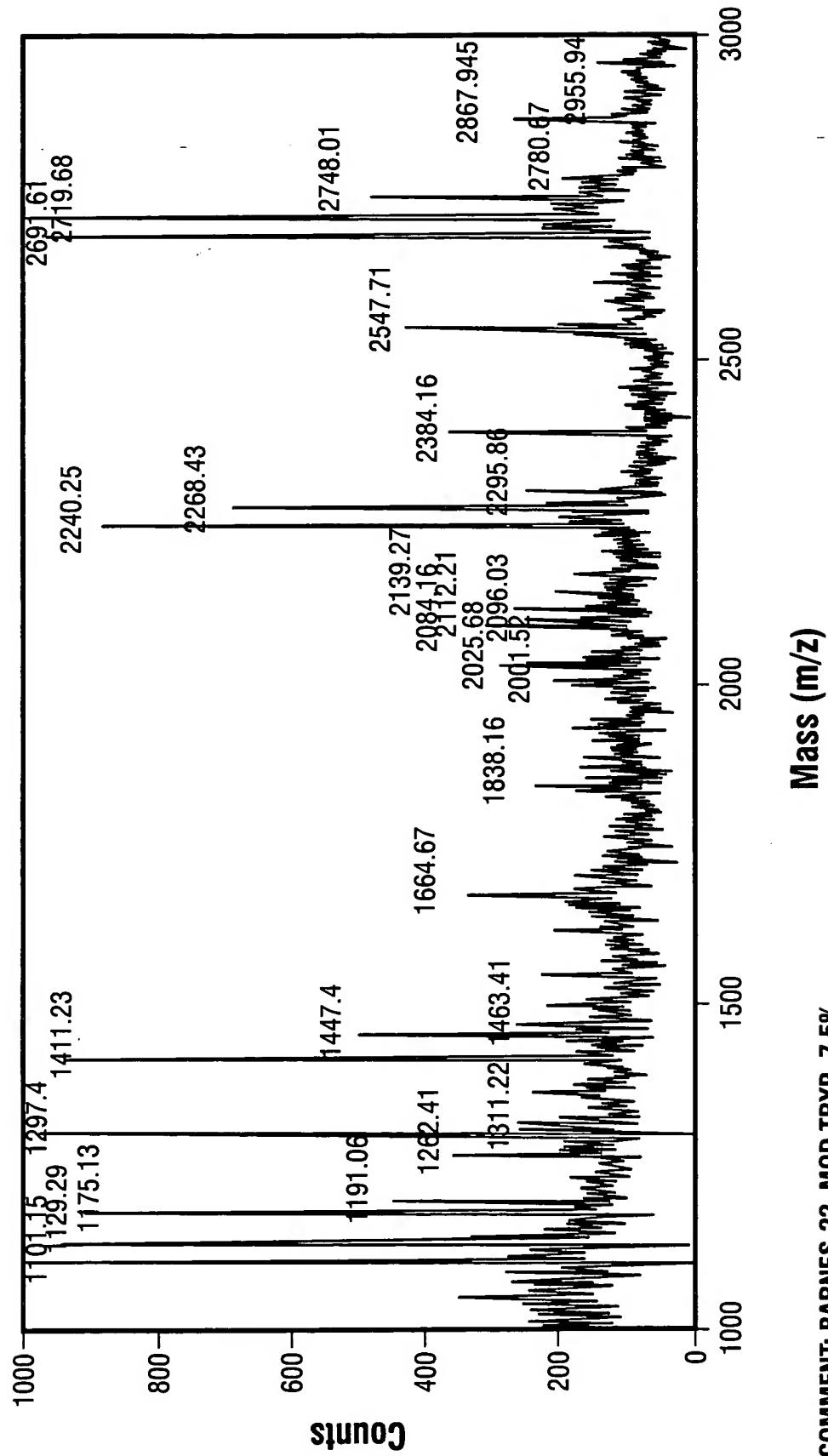


FIG. 23M (Band 22)

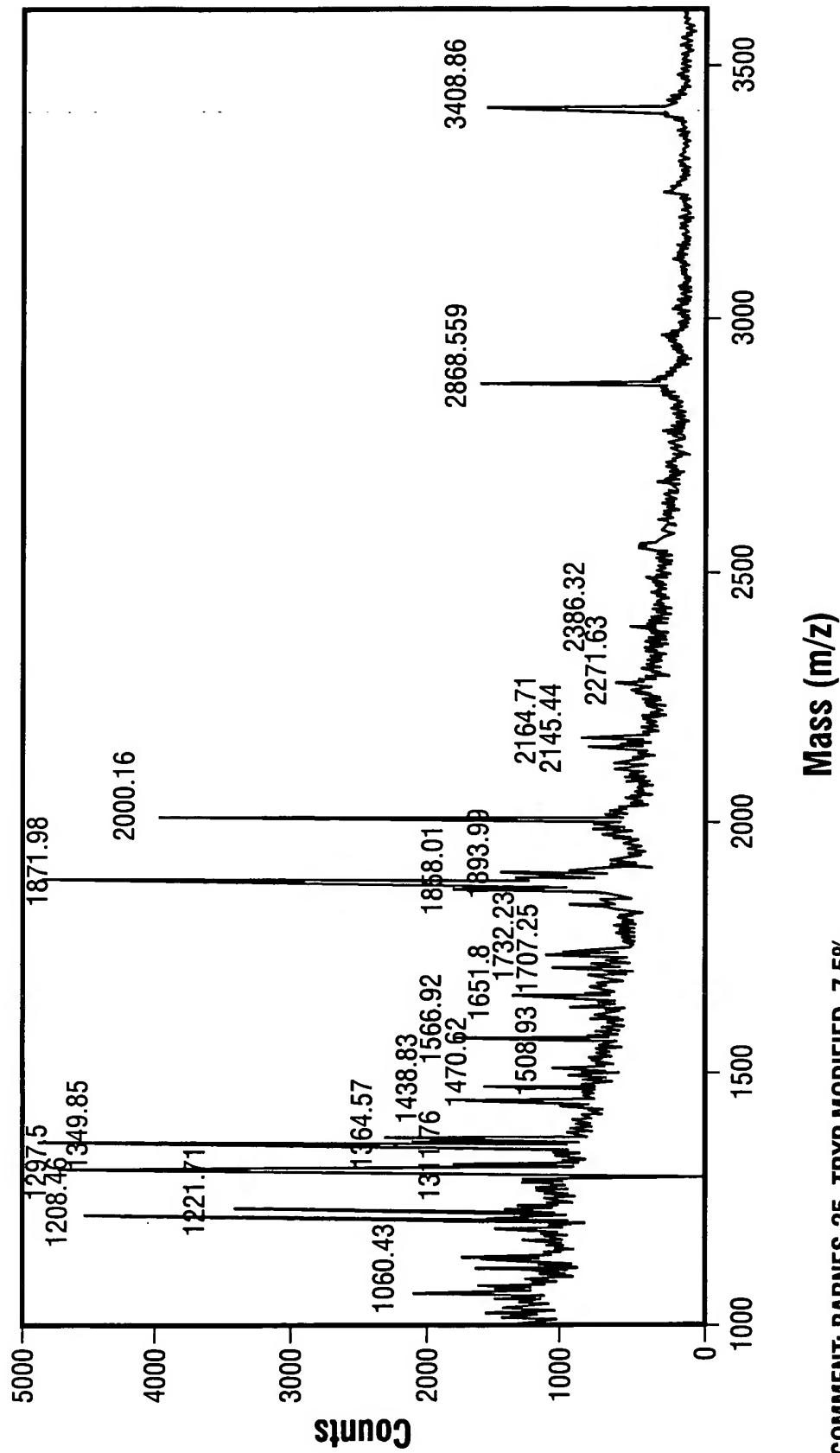
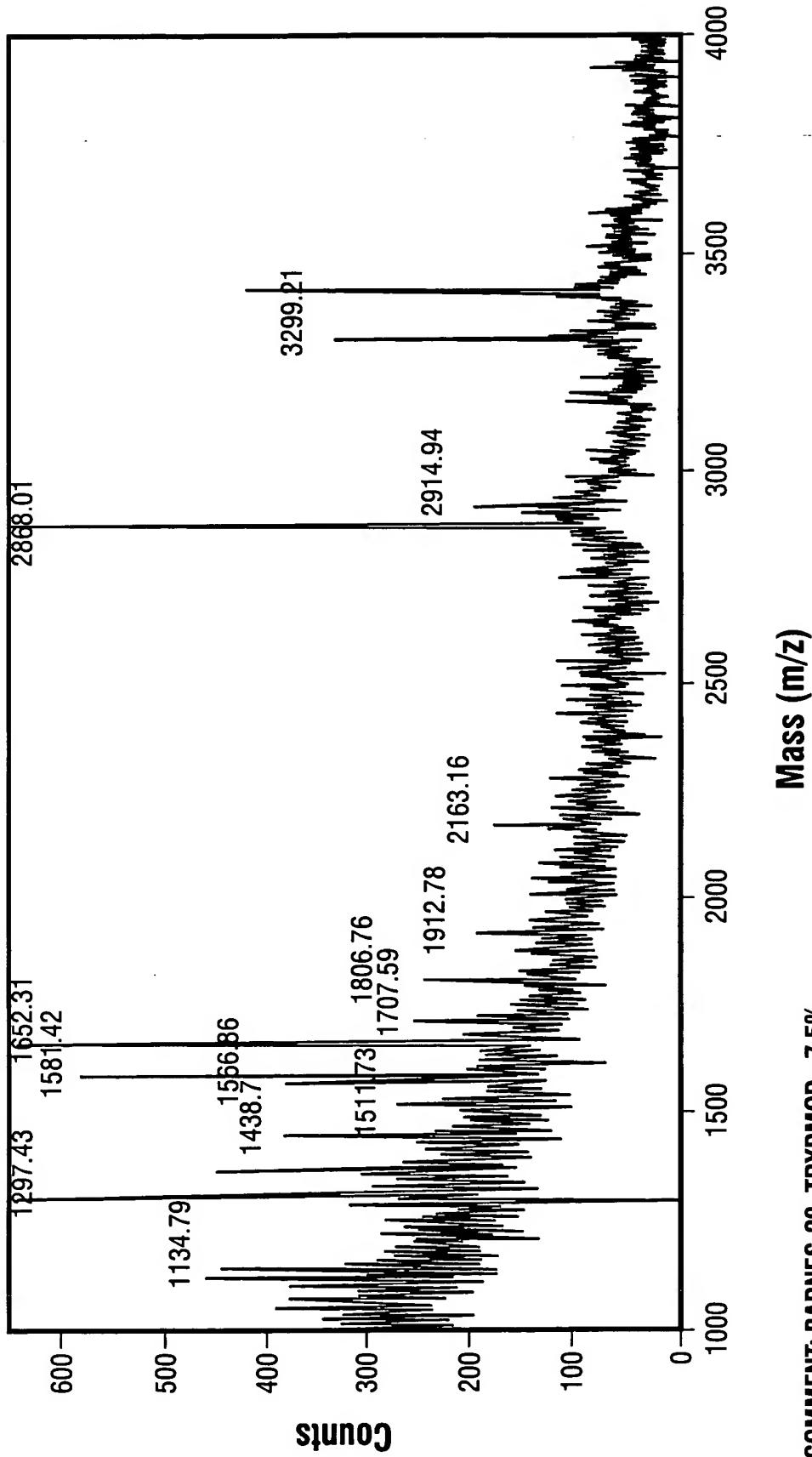


FIG. 23N (Band 25)

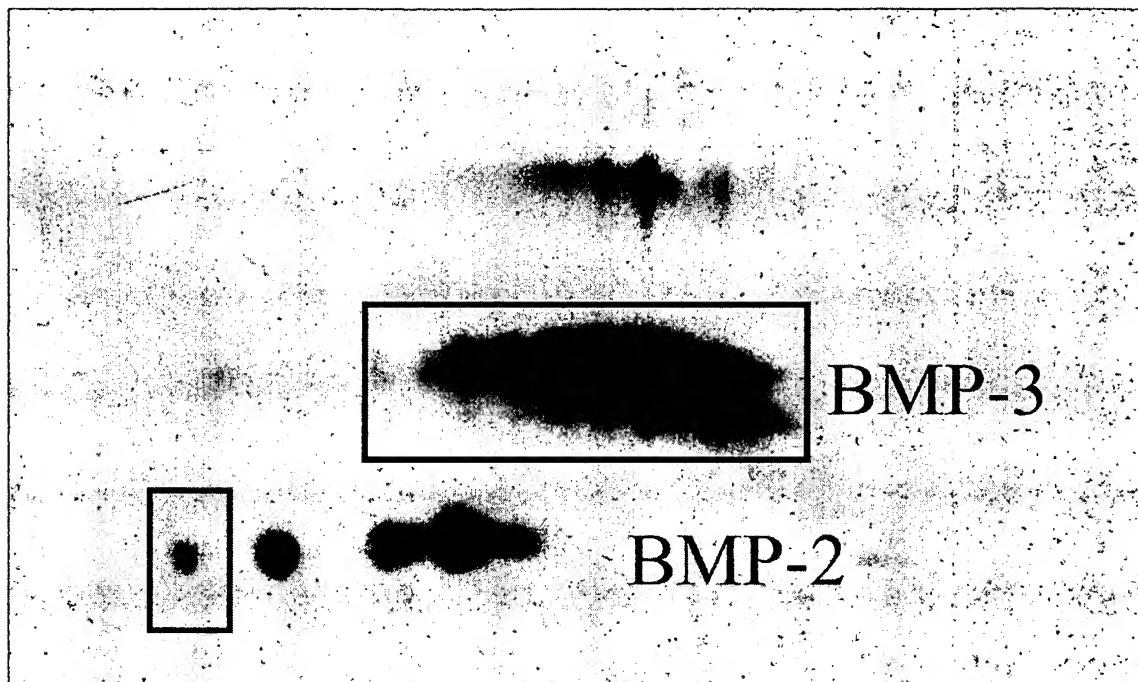


COMMENT: BARNES-29, TRYPMOD, 7.5%

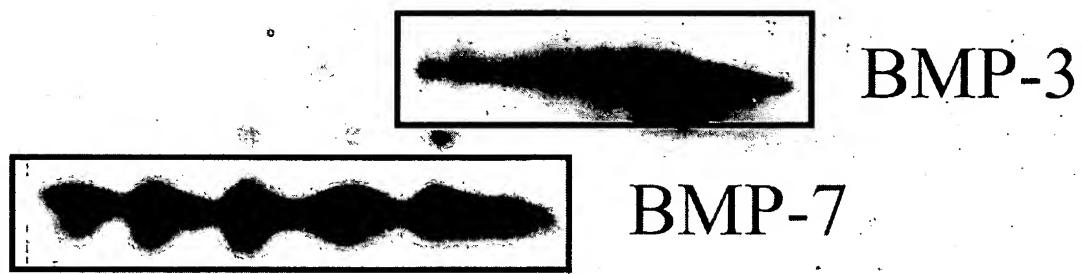
METHOD: LDE1000A ACCELERATING VOLTAGE: 25000  
 MODE: LINEAR GRID VOLTAGE: 94.000 %  
 GUIDE WIRE VOLTAGE: 0.090 % DELAY: 50 ON  
 SCANS AVERAGED: 256 PRESSURE: 3.82E-07  
 LOW MASS GATE: 500.0

LASER: 1860 MIRROR RATIO: 1.080  
 PSD MIRROR RATIO:  
 TIMED ION SELECTOR: 16.1 OFF  
 NEGATIVE IONS: OFF

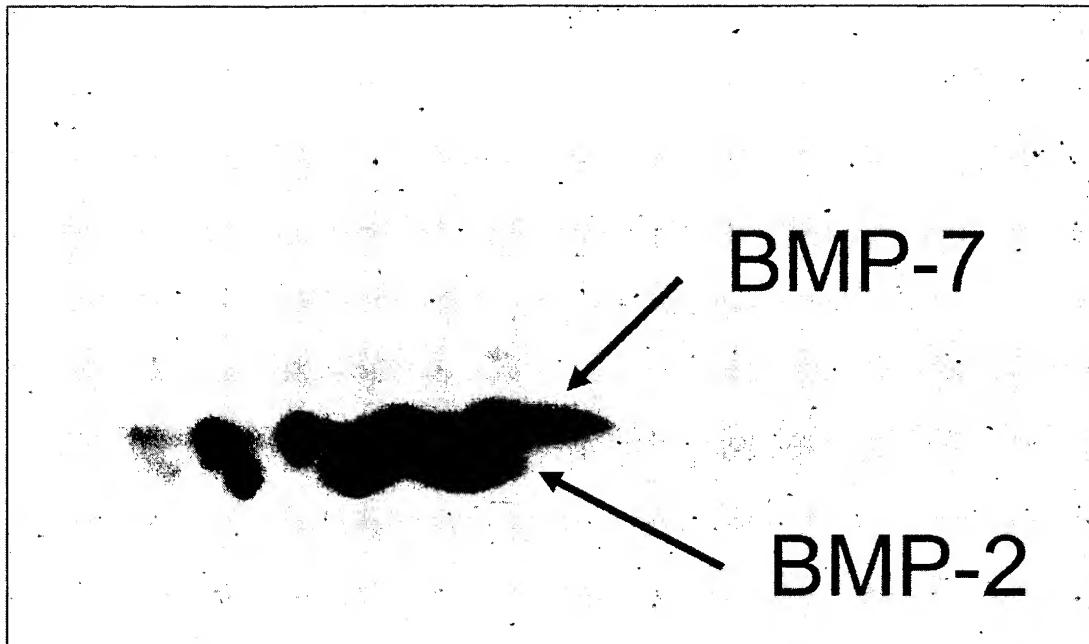
FIG. 230 (Band 29)



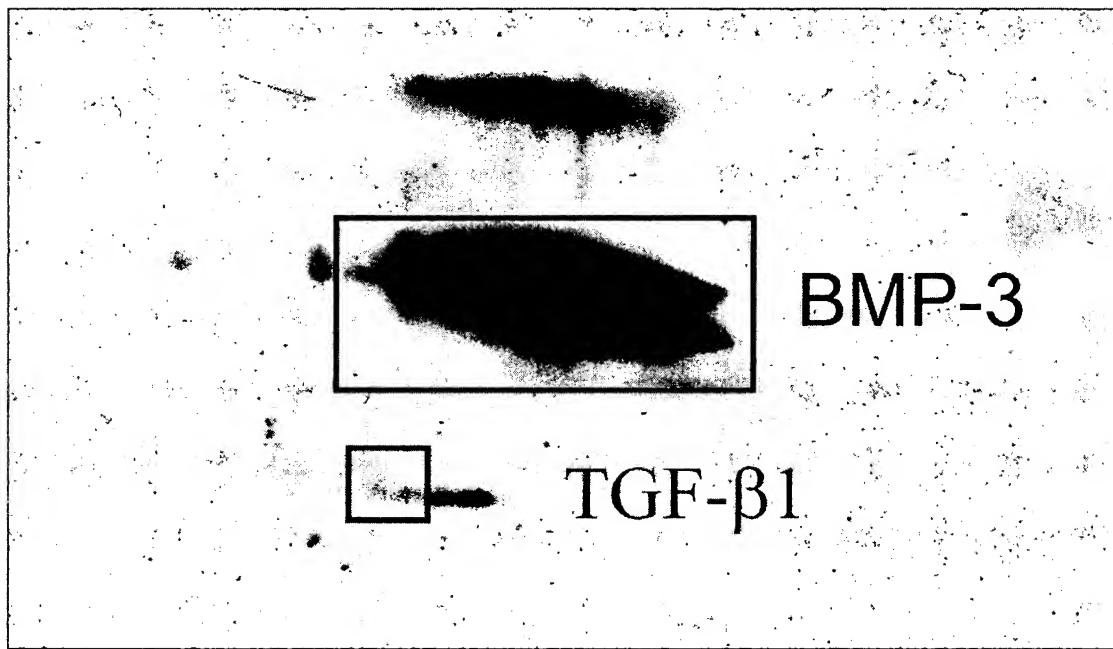
*FIG. 25A*



*FIG. 25B*

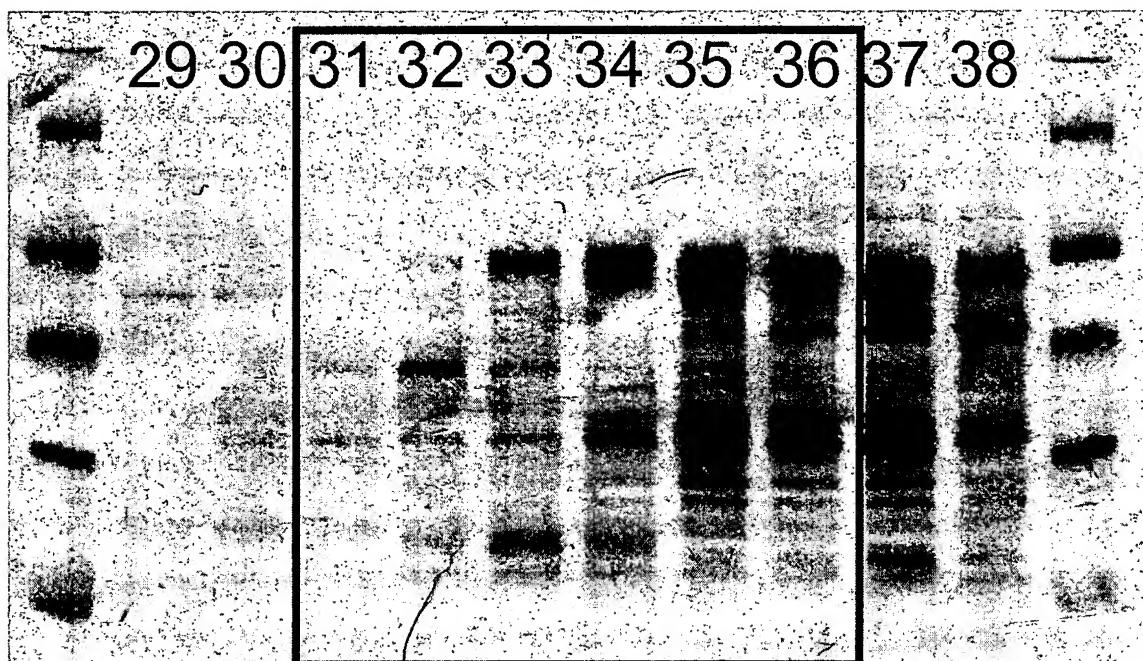


*FIG. 25C*



*FIG. 25D*

*FIG. 26*



- + +++ - + +++

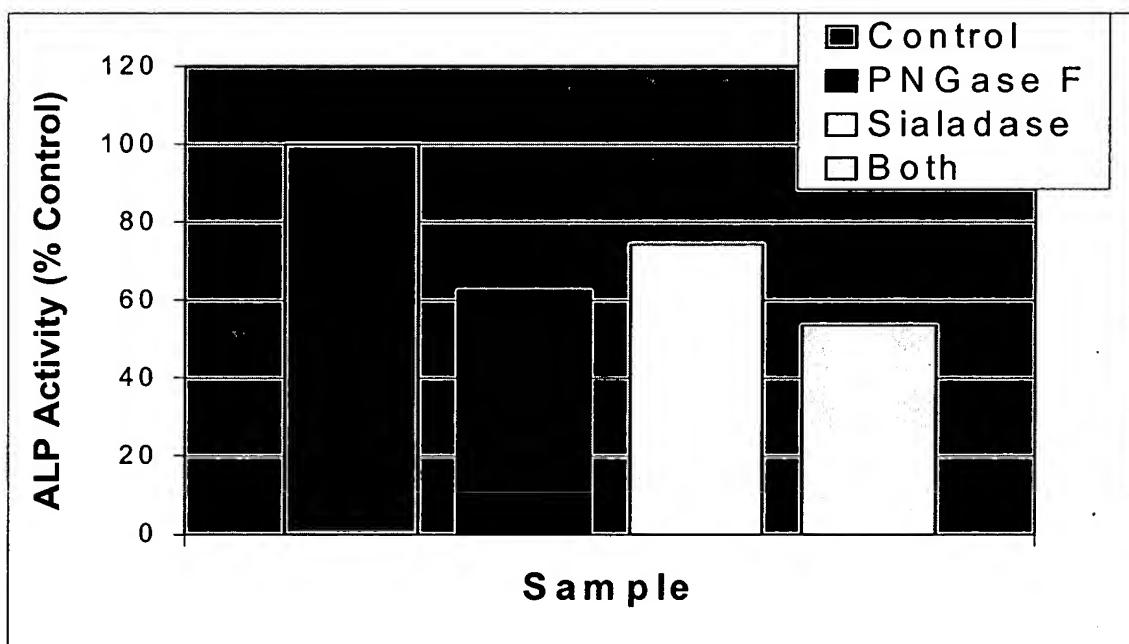
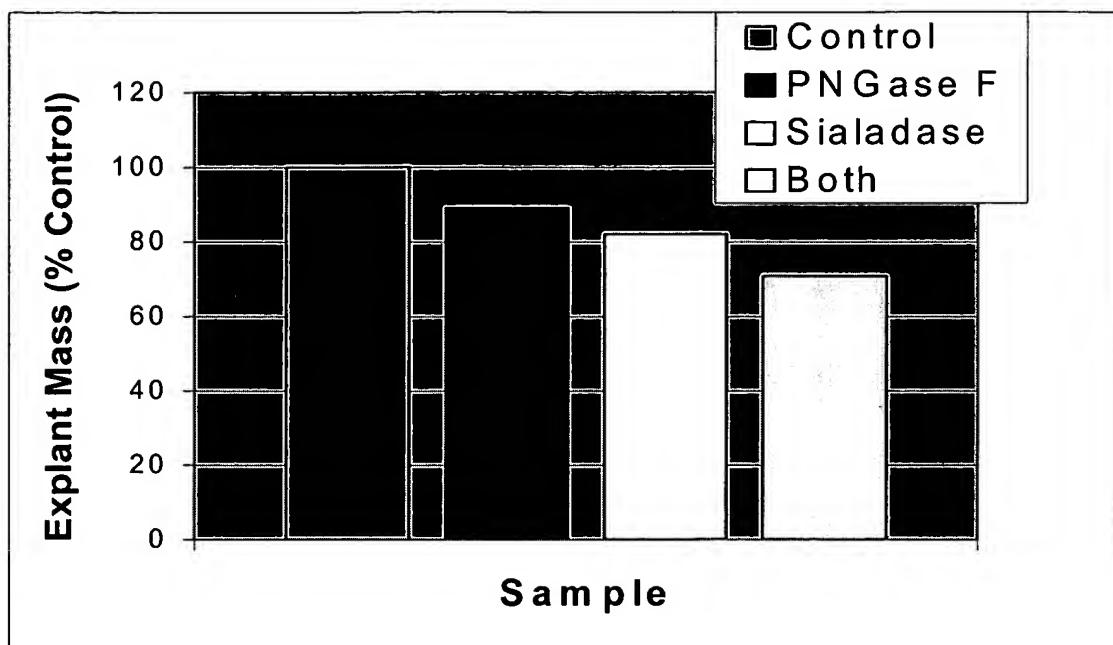


*FIG. 27*



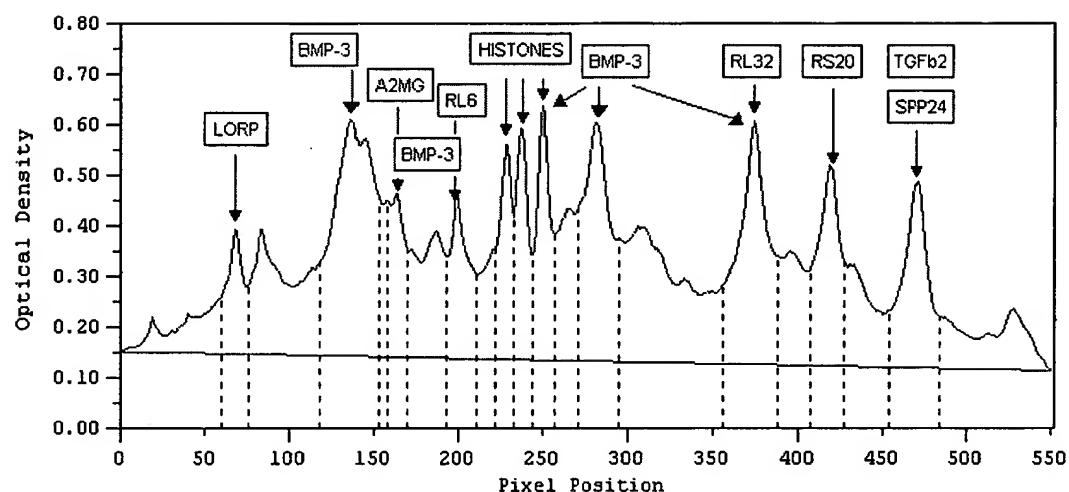
*FIG. 28*

**FIG. 29A**



**FIG. 29B**

**FIG. 30A**



**FIG. 30B**

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